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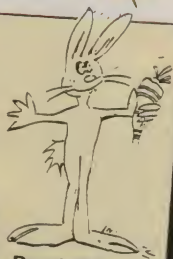
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What the press
have said

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– *Micronet 8000*

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– *Micro User*, July 1988

"Icarus is superb"

– *Electron User*, June 1988

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electron user NEWS

Electron draws more products

MORE companies than ever before are moving into the Electron market place.

That was the verdict of Pres managing director John Huddleston following the recent Electron & BBC Micro User Show at the New Horticultural Hall in London.

"Just looking around the exhibitors you could tell that the number of products available for the machine was up

by about 50 per cent", said John.

"The response to my own products was also up on the last event, with great interest being shown for the AP3 and AP6 interfaces", he said.

One reason given by Huddleston for the increase in products is that many of the items previously only available for the BBC Micro are being adapted for use with the Electron.

"The market has changed considerably in the past 12 months with sales for both machines being roughly 50:50.

"It would appear that at last Electron owners are being catered for in the same way as BBC Micro owners were when that machine first came out", said Huddleston.



All go for the Electron at the Show



Life's an adventure

If you have ever wondered what your trusty Electron User editor gets up to in his spare time perhaps this photograph will give you some idea.

Roland Waddilove - that's him on the right - is getting to grips with Corrine Russel, the star of Martech's advertising campaign for its latest game - Vixen.

On his return from the press launch he said: "It was a fantastic all-action adventure. And the game was good as well".

BIG IMPROVEMENT IN THE WEATHER

AN enhanced WeatherLink service for Electron users has been launched on MicroLink.

The result is a dramatic improvement in the quality of satellite weather pictures and the speed at which they can be downloaded.

MicroLink's top programmers worked for months to produce brand new machine specific software which has reduced download time by up to 75 per cent.

A specially designed data compression technique incorporating full error correction provides pictures three times sharper than before.

Colour resolution has been considerably heightened, making the weather maps easier to understand. The

new WeatherLink graphics standard is 320 x 200 pixels.

For the first time, instead of a kaleidoscope of colours only a professional meteorologist could interpret, WeatherLink users will see a rationalised and more comprehensive picture.

On the Electron there are four colours available in Mode 1 and eight colours in Mode 2.

Although WeatherLink has the facility to put up maps of anywhere on the globe, initially only the British Isles and nearby parts of the continent will be shown.

Feedback from WeatherLink users will decide which additional geographical areas are covered in the future.

Advert eyeeful

SUPERIOR Software's latest game for the Electron - Barbarian - may be a hit with games players, but is proving an embarrassment to a national magazine.

The game itself has met with approval from all quarters - but its advertising poster has caused an outcry because of its slightly raunchy content.

One publication only agreed to carry an advert providing the offending bits were covered up.

"I can't understand what all the fuss is about", said Steve Hanson, Superior's director.

"If anything the publicity that has arisen looks set to send Barbarian into the number one position in the software charts".

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STAYING IN THE SHADOWS

CHRIS NIXON shows how to create your own filing system in the final part of his series on shadow ram

MOST of the techniques we've acquired over the last three articles have this month been incorporated into a complete, stand-alone mini filing system — for discs only — which stores and retrieves strings from the unused memory of your Slogger Master Ram Board.

In the May 1988 issue of *Electron User*, I introduced the idea of accessing the memory in bank zero using a fixed record length as set by the variable `size%`.

Exactly the same principles apply in this month's program, *SRFS* — Shadow Ram Filing System — except that the whole utility is hidden in pages &900-&B00, well away from the Basic program area.

You may think that this program seems to be no more than a souped-up version of procedures lifted from May's *Electron User* shadow ram article, and you are partially right.

But the advantage of *SRFS* is that it now provides all of those procedures in operating system command form — something which Basic is simply unable to do.

Seven extra operating system commands are provided by *SRFS*, using exactly the same command interpreter from June's utility, *Twin*, and note that even more commands may be added, providing of course, there is sufficient space for them.

The assembled machine code must not be greater than &300 bytes long — 768 decimal — because it must steer clear of page &C00 which is used as the *SRFS* input/output buffer.

All the new commands are listed in Table 1, but before you get started, a reminder of how fixed-size

random access records work is needed. So those of you who have followed the series so far, please bear with me.

You may divide the spare 12k area in bank zero into as

many records as you wish, providing that the record size is not too large. Setting the size is achieved with the `*SIZE` command — simply set `%` to your desired record size and issue a

`*SIZE` command.

This will cause whatever value is currently assigned to `%` to be the new record size. Note, however, that if `%` is greater than or equal to 255, an error message

```

10 REM Shadow Ram
20 REM Filing System
30 REM By Chris Nixon
40 REM (c) Electron User
50 REM
60 MODE6:FORPASS=0T02STEP
2
70 ptr1=B52:ptr2=B54:mess
=B56
80 txtptr=B58:count=B59:
size=B5A
90 rec=B5C:ptr=B5E:byte=B
60
100 m1=B61:m2=B64:handle=B
66
110 size1=B67
120 ptr=B68:OPT PASS
130 LDA B209:BPL skipvec
140 LDA B208:STA B230:LDA
B209
150 STA B231:LDA #patch M0
B 256
160 STA B208:LDA #patch D1
V 256
170 STA B209
180 .skipvec
190 JMP Cclear
200 .patch
210 STX B70:STY B71:LDX #0
220 .wordip
230 LDY #1:LDA contab,X:BE
Q notfound
240 .byteip
250 LDA contab,X:CMP #13:B
EQ found
260 LDA (B70),Y:AND #223:C
MP contab,X
270 BNE nextword:INX:JNY:J
MP .byteip
280 .nextword
290 INX:LDA contab,X:BNE n
extword
300 INX:JMP wordip
310 .notfound
320 LDX B70:LDY B71:JMP (B
230)
330 .found
340 STY txtptr:LDA contab+
1,X:STA B50
350 LDA contab+2,X:STA B51
:JMP (B50)
360 .Csize
370 CLC:LDA B44C:ADC #1:ST
A size
380 LDA B44D:ADC #0:STA si
ze+1
390 LDA size+1:BEQ sizeOK
400 BRK:EQUB52:EQU'Size t
oo big':BRK
410 .sizeOK
420 RTS
430 .Crecord
440 LDA B44B:STA rec:LDA B
449
450 STA rec+1:JSR mult:LDA
ptr+1
460 CMP #B30:BCC recOK:JMP
badrec
470 .recOK
480 .mult
490 LDA size:STA m1:LDA si
ze+1
500 STA m1+1:LDA rec:STA n
2:LDA rec+1
510 STA m2+1:LDA #0:STA ptr
:STA ptr+1
520 LDY #16
530 .mloop
540 ROR m2+1:ROR m2:BCC mu
lt1
550 CLC:LDA m1:ADC ptr:STA
ptr
560 LDA m1+1:ADC ptr+1:STA
ptr+1
570 .mult1
580 ASL m1:ROL m1+1:DEY:BN
E mloop
590 RTS
600 .Cput
610 LDA #0:STA count
620 .putloop
630 LDY count:LDA B400,Y:J
SR put
640 JSR incptr:JSR checkra
n:INC count
650 LDA count:BEQ error:CM
P size
660 BCC put1:BEQ put1
670 .error
680 BRK:EQUB50:EQU'String
exceeds record size':BRK
690 .put1
700 LDA byte:CMP #13:BNE p
utloop
710 JMP nextrec
720 .Cget
730 LDA #0:STA count
740 .getloop
750 JSR get:LDY count:STA
B400,Y
760 JSR incptr:JSR checkra

```


number 52 is generated: *Size too big.*

This is because Basic cannot handle strings with a length greater than 255 characters. And as SRFS reserves one extra character in each record as the carriage return marker, this limit becomes 254.

In all, SRFS can generate three possible errors and associated error numbers, thereby enabling Basic's ON ERROR condition to fully trap any mistakes you make. We'll cover these messages as we go along.

After setting the record size, you are ready to begin storing and retrieving strings from your 12k data area. To do this, you must tell SRFS which record you want to deal with by giving *R%* a record number, and issuing a *RECORD command.

In a similar fashion to *SIZE, *RECORD makes SRFS take whatever value is in *R%*, but this time it is used

as the record number. The record size is then multiplied by this number to obtain the exact position within bank zero to which SRFS will set its record pointer.

If the new pointer value exceeds the end of the 12k data area, an error number 51 will be generated: *Ram bank overflow.* This is simply to inform you that an illegal address has been obtained, and any subsequent read or writes at this address will generate the same error.

To file a string at the pointer's current position, it must first be placed in page &C00, with a statement similar to these two examples:

```
&C000="You are facing north."
&C000=LEFT$(AS,20)
```

Next, the string is filed with the *PUT command. To

*SIZE	Uses <i>S%</i> to set the record size
*RECORD	Uses <i>R%</i> to set the record pointer
*PUT	Places &C00 in bank zero
*GET	Retrieves &C00 from bank zero
*RAMSAVE	Saves all 12k of data to disc
*RAMLOAD	Loads data area from disc
*CLEAR	Wipes the 12k area clean
*HELP	Lists SRFS commands along with roms

Table 1: The command list

retrieve a string, follow the same steps, but use *GET instead. Obviously, this time there is no need to have placed anything into &C00 first - if you had it would be wiped out by the action of *GET.

If either a *PUT or a *GET command causes the SRFS ram pointer to extend past &3000 while in the process of storing or retrieving a record, you will also receive error number 51. And if, while PUTting or GETting, SRFS finds that the string in question is longer than the record size - as set up with *S%* and *SIZE - then a different error, number 50, will

be displayed: *String longer than record size.*

All three possible SRFS errors generate numbers which Basic has left free, so that if your error trapping routine spots them it knows that they were caused by the SRFS - unless you have a utility rom which also uses these numbers for its own error messages.

The next two commands are for saving and loading the complete 12k data area to or from disc, and are entered in the conventional way. That is, with a legal filename following. There

Turn to Page 10 ▶

```
n:INC count
770 LDA count:BEQ error:CM
P size1
780 DEC get1:BEQ get1:JMP
error
790 .get1
800 LDA byte:CMF #13:BNE g
et1loop
810 JMP nextrec
820 .put
830 STA byte:LX ptr:LDB p
tr+1
840 LDA #&40:PHA:PLP:LDA b
yte
850 JMP &BF0
860 .get
870 LX ptr:LDB ptr+1:LDA
#B:PHA
880 PLA:JSR &BF0:STA byte
:RTS
890 .Create
900 CLC:LDA #70:ADC txtptr
:TAX
910 LDB #71:LDA #80:JSR &
FFCE
920 STA handle:LDA #B:STA
ptr
930 STA ptr+1
940 .saveLoop
950 JSR get:LDB handle:JSR
&FFD4
960 JSR incptr:LDA ptr+1:C
MP #B30
970 DEC saveLoop:LDB handl
e:LDA #B
980 JMP &FFCE
990 .Cload
```

```
1000 CLC:LDA #70:ADC txtptr
:TAX
1010 LDB #71:LDA #&40:JSR &
FFCE
1020 CMP #B:BNE toed:BRK:EQ
UB52
1030 EQU$File not on disc'
:BRK
1040 .load
1050 STA handle:LDA #B:STA
ptr
1060 STA ptr+1
1070 .loadLoop
1080 LDB handle:JSR &FFD7:B
CS endLoop
1090 JSR ptr:JSR incptr:JMP
loadLoop
1100 .endLoop
1110 LDB handle:LDA #B:JMP
&FFCE
1120 RTS
1130 .clear
1140 LDA #B:STA ptr:STA ptr
+1
1150 STA size:STA size+1:ST
A rec
1160 STA rec+1
1170 .clear
1180 LDA #13:JSR put:JSR in
cptr
1190 LDA ptr+1:CMF #B30:BNE
clear
1200 LDA #B:STA ptr:STA ptr
+1:RTS
1210 .help
1220 LDA #title MOD 256:STA
mess
```

```
1230 LDA #title DIV 256:STA
mess+1
1240 JSR message:LDA #6:STA
count
1250 LDH #B
1260 .indent
1270 LDA #32:JSR &FFEE:LDA
#42:JSR &FFEE
1280 .creed
1290 LDA count,X:CMF #13:B
EQ help1
1300 AND #223:JSR &FFEE:INX
:BNE creed
1310 .help1
1320 JSR &FFET:INX:INX:INX
INX
1330 DEC count:BPL indent:L
DA #70
1340 LDB #71:JMP (&2B0)
1350 .message
1360 LDB #B
1370 .messLoop
1380 LDA (mess),Y:BEQ endme
ss
1390 JSR &FFFE:INX:BNE mess
Loop
1400 .endmess
1410 RTS
1420 .incptr
1430 CLC:LDA ptr:ADC #1:STA
ptr
1440 LDA ptr+1:ADC #B:STA p
tr+1:RTS
1450 .checkram
1460 LDA ptr+1:CMF #B30:BCC
ptrOK
1470 .bedrwn
```

```
1480 BRK:EQU$1:EQU$New be
nk overflow:BRK
1490 .ptrOK
1500 RTS
1510 .nextrec
1520 CLC:LDA rec:ADC #1:STA
rec
1530 LDA rec+1:ADC #B:STA r
ec+1
1540 JMP mult
1550 .title
1560 EQU$1:EQU$SRFS commu
nds:EQU$1:BRK
1570 .contab
1580 EQU$SIZE:EQU$1:EQW
Csize:BRK
1590 EQU$RECORD:EQU$1:EQ
W Crecord:BRK
1600 EQU$PUT:EQU$1:EQW
Cput:BRK
1610 EQU$GET:EQU$1:EQW
Cget:BRK
1620 EQU$RAMSAVE:EQU$1:E
QUW Csave:BRK
1630 EQU$RAMLOAD:EQU$1:E
QUW Cload:BRK
1640 EQU$CLEAR:EQU$1:EQW
Cclear:BRK
1650 EQU$HELP:EQU$1:EQW
Chelp:BRK
1660 BRK
1670 #3:TEXT
1680 OSCLI$SAVE SRFS ROM *A
SRFS*PI
```


◀ From Page 9

Type in Program 1 and

```

5 REM Program II
10 MODE 6
20 S1=50
30 *SIZE
40 FOR R1=0 TO 4
50 *RECORD
60 READ $BC00
70 *PUT
80 NEXT
90 END
100 DATA 'LOOK... THIS IS A'
110 DATA 'TEST OF THE NEW'
120 DATA 'ELECTRON SRFS'
130 DATA 'UTILITY, WHICH'
140 DATA 'IS VERY USEFUL'

```

Now type in Program III and run it. As you can see,

```

5 REM Program III
10 MODE 6
20 SX=20
30 =SIZE
40 FOR RX=0 TO 4
50 =RECORD
60 =GET
70 PRINT S&C00
80 NEXT
90 END

```

It's now up to you to make what you can of your extra 12k, using the techniques discussed during this series, and we at *Electron User* will await the submission of any resultant programs with great interest.

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Getting your name up in lights

ROLAND WADDILOVE keeps track of the score in the final part of his sprites series

SO far in this series I have presented a Mode 5 sprite editor that enables you to create multi-coloured characters, a variety of print routines which move them in front and behind objects on screen and several map drawing facilities.

To round off this brief look at some of the techniques used in writing fast-moving all-action arcade games, this month I'll show how to keep track of the score and display it on the screen.

There are several ways of doing this, each with attendant advantages and disadvantages.

The first method we'll look at is shown in Program 1, so enter and run this, not forgetting to save it first just in case you make a typing error and the Electron crashes – always a problem with machine code programs.

You'll see the score printed in the centre of the screen. Tap the spacebar to increment it and notice that it goes up in 10s. Actually this is an illusion, as it really

increases by one each time.

Line 80 prints a row of five zeros in the middle of the screen initialising the score, but only the first four digits are updated. The extra zero tagged on to the end gives the impression that the score goes up in 10s.

The score is stored as the string "0000" at line 470, and the subroutine *score* increments the last digit by one.

If the Ascii code becomes equal to ASC"0"+10 it is reset to ASC"0" and the next digit is incremented. This is tested for ASC"0"+10 and so on for all four digits.

The score is printed by picking up each character and passing it to the



operating system print routine *oswrch* in lines 380 to 430.

The three EQUBs at line 460 hold the screen print coordinates of the score in the form VDU 31,x,y. Alter the last two parameters to position the score elsewhere.

This routine has the advantage of simplicity and compactness. It isn't particularly fast, as it uses the operating system to print the digits. However, it's quick enough for the majority of games, particularly *Electron User* listings.

The second method we'll look at uses binary coded decimal arithmetic, which, although sounding very complicated, is fairly straightforward, but it does involve a bit of extra code.

Enter and run Program 11 to see this technique in action, and tap the spacebar to increment the score. Notice that this time it goes up in 50s.

Again it's an illusion as the last digit – zero – remains unaltered and the

program increments the score in steps of five each time.

The score is stored at &71 – labelled *digits* in line 150 – and four digits are stored in just two bytes. If you look at these in hexadecimal they would appear to be like 00 00 at the start of the program.

Adding five in lines 310 to 370 makes them 00 05, another five and they become 00 10, then 00 15 and so on. As you can see, each nybble holds a separate digit and to display the score all we need to do is write a hexadecimal print routine. You can see this at lines 420 to 530.

The left digit in each byte is rotated into the right nybble using LSR A, masked off with AND #&0F and turned into an Ascii digit by adding ASC"0". Again *oswrch* is used to print the characters.

How do we make the 6502 use binary coded decimal instead of ordinary arith-

```

10 REM Score 1
20 REM By R.A.Waddilove
30 REM (c) Electron User
40 MODE 5
50 PROCassemble
60 PRINT TAB(0,5)"Tap th
  e spacebar..."
70 COLOUR 2
80 PRINT TAB(4,10)"SCORE
:00000"
90 CALL @900
100 END
110
120 DEF PROCassemble
130 oswrch=&20E
140 FOR pass=0 TO 2 STEP
  2
150 PX=&900
160 [OPT pass
165
170 .main
180 JSR @FF0
190 BCS exit
200 JSR score
210 JRP main
220 .exit
230 RTS
240
250 .score
260 LDX #3
270 .loop
280 INC digits,X
290 LDA digits,X
300 CMP #ASC"0"+10
310 BNE sc.ok
320 LDA #ASC"0"
330 STA digits,X
340 DEX
350 BPL loop
360 .sc.ok
370 LDX #0
380 .loop
390 LDA digits-3,X
400 JSR oswrch
410 INX
420 CPX #7
430 BNE loop
440 RTS
450
460 EQUB $1:EQUB 10:EQUB
  10
470 .digits EQU$ "0000"
480 ]
490 NEXT
500 ENDPROC

```

Program 1

Turn to Page 12 ►

Programming

Special: Arcade game creator

◀ From Page 11

metlc? This is in fact easily done, simply execute SED — SET Decimal mode flag in the status register — just before incrementing the score.

Don't forget to clear it afterwards with CLD — Clear Decimal mode flag — otherwise you may find your program producing odd results.

This routine is still fairly compact, and relatively simple. But as before, it isn't particularly fast, though it is quick enough for most games, especially magazine listings.

The final method is shown in Program III. Enter and run this, and as with the others, tap the spacebar to increment the score.

This is by far the longest listing, and the most complex too. However, it is extremely fast so is preferred when maximum speed is essential.

It uses the binary coded decimal arithmetic method of Program II, though the Ascii string method of Program I could have been used just as easily.

The reason this program is so much faster than the others is that it contains its own print routine, and the

numbers are stored as sprites. They were designed using the sprite designer in the first article in this series.

The print routine can be seen at lines 510 to 560 and is a straight poke of eight bytes to the screen. This makes each digit half the normal Mode 5 width.

And that rounds up this series on writing arcade games. There is plenty of material in these six articles to keep you occupied for some time to come, and all the listings are available on our Arcade Game Creator tape.

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```
10 REM Score 2
20 REM By R.A.Waddilove
30 REM (c) Electron User
40 MODE 5
50 PROCasemble
60 PRINT TAB(0,5)"Tap th
e spacebar..."
70 COLOUR 2
80 PRINT TAB(3,10)"SCORE
:000000"
90 CALL 6900
100 END
110
120 DEF PROCasemble
130 oswrch="620E
140 temp=670
150 digits=671
160 !digits=0
170 FOR pass=0 TO 2 STEP
2
```

```
180 PX=6900
190 COPT pass
200
210 .main
220 JSR 6FFED
230 BCS exit
240 JSR score
250 JMP main
260 .exit
270 RTS
280
290 .score
300 SED
310 CLC
320 LDA digits+1
330 ADC #5
340 STA digits+1
350 LDA digits
360 ADC #0
370 STA digits
```

```
380 CLD
390 LDA #31:JSR oswrch
400 LDA #10:JSR oswrch
410 LDA #10:JSR oswrch
420 LDA digits:JSR print
430 LDA digits+1
440 .print
450 STA temp
460 LSR A:LSR A:LSR A:LSR
A
470 JSR number
480 LDA temp
490 .number
500 AND #0BF
510 CLC
520 ADC #ASC"0"
530 JMP oswrch
540 J
550 NEXT
560 ENDPROC
```

Program II

```
10 REM Score 3
20 REM By R.A.Waddilove
30 REM (c) Electron User
40 MODE 5
50 PROCasemble
60 PRINT TAB(0,5)"Tap th
e spacebar..."
70 COLOUR 2
80 PRINT TAB(3,10)"SCORE
:"
90 CALL 6900
100 END
110
120 DEF PROCasemble
130 new=670
140 temp=672
150 digits=673
160 !digits=0
170 FOR pass=0 TO 2 STEP
2
180 PX=6900
190 COPT pass
200
210 .main
```

```
220 JSR 6FFED
230 BCS exit
240 JSR score
250 JMP main
260 .exit
270 RTS
280
290 .score
300 LDA #610:STA new:LDA
#605:STA new+1
310 SED
320 CLC
330 LDA digits+1
340 ADC #5
350 STA digits+1
360 LDA digits
370 ADC #0
380 STA digits
390 CLD
400 LDA digits:JSR print
410 LDA digits+1
420 .print
430 STA temp
440 LSR A:LSR A:LSR A:LSR
```

```
A
450 JSR number
460 LDA temp
470 .number
480 AND #0BF
490 ASL A:ASL A:ASL A
500 TAI
510 LDY #0
520 .loop
530 LDA mndata,X
540 STA (new),Y
550 INX
560 INY:CPY #8:BNE loop
570 CLC
580 LDA new:ADC #8:STA ne
w+1
590 LDA new+1:ADC #0:STA
new+1
600 RTS
610
620 .mndata
630 OPT Fread
640 J
650 NEXT
660 ENDPROC
670
680 DEF Fread
690 RESTORE
700 REPEAT
710 READ byte
720 COPT pass
730 EQU byte
740 J
750 UNTIL byte<0
760 .pass
770
780 DATA 14,10,10,10,10,1
0,10,14
790 DATA 6,6,6,6,6,6,6,6,
14,10,2,2,6,12,8,14,10,2
,6,6,2,10,14,2,6,4,12,8,10,
14,2
800 DATA 14,8,8,14,2,2,10
,14,12,8,8,8,14,10,10,14,10
,14,2,2,6,4,4,14,10,10,14,
10,10,10,14
810 DATA 14,10,10,14,2,2,
2,2,-1
```

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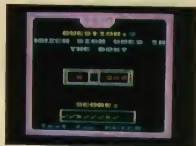


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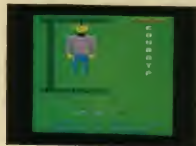


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Blackhall, 10 Drowning Street, the sewers, Heathrow Airport, Greenland, and a location so secret that no one even knows where it is.

During your endeavours you will come across some familiar faces – enlist their support if you can. But watch out for the technical wizard Q, and his many strange and dangerous creations.

Several objects are scattered about, and the purpose of some is rather dubious to say the least. Among the items to be found are a Sinclair Z88, a pound coin, some US secrets and a passport.

During the game you control a small, cloaked figure, which is presumably a cat in a trenchcoat. It is animated quite smoothly, and responds tightly to the control keys.

The best bit of animation is when

you leave the keyboard alone for a while. After a few moments, Spycat will flash at you, revealing a kinky penchant for polka-dot boxer shorts.

To use certain items, you must be standing on one of several platforms which are scattered at various useful locations. And that brings me to the worst feature of Spycat.

Every action in the game, apart from the movement of the main figure, is controlled from a small panel of icons



Spycat meets an enemy agent

at the top of the screen.

Picking up, replacing and using objects, opening doors, turning the game sound on and off and more are all done by moving a pointer to highlight the relevant icon, followed by pressing Return.

This seems silly. In a different game with a different scenario it would be a perfectly acceptable way of controlling parts of the action. In Spycat however, with its already crowded Mode 5 screen, it quickly becomes tiresome and slows down the action.

This is a shame, as it's my only complaint in an otherwise excellent game. I can see the temptation to add more of a high-tech feel to a game of this type, but the programmer has



succumbed to using positively unhelpful gimmickry.

All in all, though, Spycat is an excellent arcade adventure with a strong vein of humour underlying all the action – seeing Maggy at her desk in number 10 Drowning Street really tickled me.

If you can get used to the unwieldy icon system, this game is certainly worth the cash – it will puzzle and amuse you for days to come.

Chris Nixon

Sound.....	3
Graphics.....	9
Playability.....	8
Value for money.....	8
Overall.....	7



Margaret Thatcher at 10 Drowning Street

Cheap thrills

Product: Four Great Games

Price: £3.99

Supplier: Tynesoft, Unit 3, Addison Industrial Estate, Blyndon, Tyne & Wear NE21 4TE.
Tel: 091 414 4611

BUDGET games are the bread and butter of the Electron games market at the moment, and the vast majority of products released on budget labels are pretty good value for money.

Four Great Games is a new two-cassette compilation of four Tynesoft games previously released in their own right.

At £3.99 it's aimed at the limited pocket money end of the market, and as the blurb on the cassette inlay points out, you're paying less than £1 per game.

However, this rather hides the fact that two of the games as they stand are, in my opinion, not up to the present general standard expected of even budget software.

Kastle is the first of the four titles, and is one of the exceptions to my



Kastle - an arcade adventure

criticisms. It's an arcade adventure in which you play the part of a knight, armed with a broadsword, who must negotiate the long-forgotten castle of Keldtown forest to reach your goal.

What this goal is supposed to be is not mentioned, but perhaps that's part of the puzzle - which is quite complex, involving hidden levers, moving portcullises and shifting platforms.

I quite enjoyed the game. There are skeletons to fight and evil black crows will swoop on you from their perches. Both can be dispatched swiftly with your sword, but must be hit before they get past your sword arm.

US Drag Racing surprised me the most. Apparently it was previously available as a full-price game on its own.

The starting screen looks impressive enough, with two powerful dragsters sitting on the line waiting for the green light. But the fun begins when you start your motor and move off.

Reving the engine is achieved by frantically pumping two keys up and down to a set rhythm. Until now, I had

thought that this sort of action was reserved for sports-type simulations - it is totally inappropriate when applied to controlling a racing car of whatever description.

Having mastered accelerating off the starting line, I was in for my second surprise. The only parts of the game which are animated are the black and white edges of the two racing lanes.

Not even the occasional bit of scenery flies by to give an impression of speed, which, by the way, is incredibly slow anyway, despite the lack of animated action.

Goal fared rather better. In fact, it was my favourite out of the four, achieving by far the best animated sequences and excitement factor. You have the programming talents of Tynesoft's Dave Croft to thank for this soccer simulation.

You can control any of the white players. Depending on which is closest to the ball, control is passed to the nearest player by pressing Return.

This is an unfortunate choice of key, however, because it is also used to kick the ball when you are up close to it.

The result of a missed kick can be a sudden switch of control to another player, which can take you a moment or two to realise, leaving you way off the ball by the time the penny drops.

The opposing side is controlled by the Electron, and you can decide between two levels of difficulty. I found the lower level more than hard enough, as the computer-controlled players make fewer mistakes in manoeuvring.

The final game, **Space Caverns**, is another let-down. It's based on the popular lunar-landing games of the early eighties, except that you must negotiate your small craft through winding caverns to reach the exit.

The game looked quite promising -



Goal - a superb soccer simulation



the first cavern is very colourful, and leads you to expect more of the same. But after carefully nudging the rocket boosters - full mass and inertia are applied to your ship - and reaching the far wall, disappointment quickly follows.

Screen two is no more than a jumbled array of coloured triangles, with none of the coloured stippling present in the first cavern. It shows that memory must have been tight, preventing more detailed screens from being stored.

But considering what phenomenal scenarios have been squeezed into some Electron games, I find this a poor excuse, and felt quite hoodwinked.

In all, I found Four Great Games fairly average. It contains nothing to make it stand out from the crowd in a market which is steadily gaining respect in most quarters for surprisingly high standard games.

Pete Fawcett

Sound.....	4
Graphics.....	6
Playability.....	6
Value for money.....	4
Overall.....	4

Bargain challenge

Product: *Way of the Exploding Fist*
Price: £1.99
Supplier: Mastertronic, 8-10 Paul Street,
 London EC2A 4JH.
Tel: 01-377 8411

WAY of the Exploding Fist is a re-issue of a piece of software which was so well received when it first came out that it won a number of awards.

It is a karate simulation game in which your aim is to work your way through the various skill levels until you reach 10th Dan.

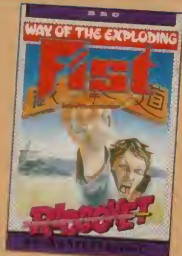
Unlike other similar programs, the setting is very definitely sporting. The rules of karate are adhered to in a fairly strict manner – no weapons are used except the hands and feet. As is usual with these karate simulations,

the main problem is getting to grips with the mind-boggling number of actions.

There are some 16 different functions, controlled either from the keyboard or from a joystick. These give you a full range of punches, kicks, somersaults and other movements. This impressive array of actions can be used against a computer controlled opponent or another person.

The best way to practise moves is to select the two-player option, but not have a second player. Having mastered the keys required, you will be ready to tackle the computer opposition.

Your first adversary is remarkably unskilled and it should not take you long to score a victory. The next competitor is much more adept at



dodging your moves and then telling you with a quick round-house kick.

With a lot of practice you will be able to beat a whole series of opponents, each a little more skilled than the previous one.

The graphics are very good with fast, flicker-free movement and the sound is adequate.

If you missed Way of the Exploding Fist first time round and haven't found it on a compilation then this re-release is a real snip.

Rog Frost



Graphics	8
Sound	5
Playability	9
Value for money	9
Overall	8

Budget bash-'em-up

Program: *The Axe of Kolt*
Price: £5.95
Supplier: The Elk Adventure Club, 2 The
 Beeches, Tilbury, Essex RM18 8ED.
Tel: 03752 4860

SCIENCE fiction fans will delight in having copies of Larry Horsfield's first two adventures, *Magnetic Moon* and *Starship Quest*. However, this undertaking is something of a deviation, as it is quite definitely of the Tolkien fantasy mould.

In this four part adventure you play the hero, Alaric Blackmoon, in search of the immortal Axe of Kolt. Your quest is to find and return the weapon to King Kelson in order to defeat the reptilian Xixon who are wreaking their revenge upon his kingdom.

Each of Larry's games include many screens of intricately worded introductory prose to set the scene for the ensuing escapade, and help create

a cool atmosphere. Part one requires much interaction with other characters in the game in order to make progress. The atmospheric room descriptions give direct and cryptic help for decisions which you must make later in the game. My advice is to look and listen carefully.

The second part involves a trip to the forest in order to kill the evil Morgeh. Once this is achieved by completing a set of neat chaining puzzles, you have broken the back of this quest. I felt a definite sense of achievement at this point.

Part three involves some mine exploration in typical Indiana Jones fashion. You will need to examine your surroundings thoroughly, using all of your senses if you are to not only survive, but also succeed.

The last part is by far the most difficult and also the best component of this mega-jant. In a setting outside

the Xixon fortress, you must escape and find King Kelson.

The action is cold-blooded and not for the faint-hearted. Once again it is important to take note of the location descriptions.

This enjoyable romp needed a lot of mapping and thinking, as well as direct action. *Axe of Kolt* is probably ideally suited for the more experienced traveller, but the Elk Adventure Club offers an excellent Help service.

Though the normal restrictions of Quilled adventures apply, I believe that this is Larry's best offering to date. A challenging adventure at a bargain price.

Pendragon

Presentation	6
Atmosphere	8
Frustration factor	9
Value for money	10
Overall	8

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- *Ian Waugh, Electron User, January 1988.*



Suitable for	Product	Format	RRP	Special reader offer	YOU SAVE	Offer including subscription	YOU SAVE
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TO ORDER PLEASE USE THE FORM ON PAGE 45

Adventures by Pendragon

Upgrade route to adventures new

IF we are to believe the experts and wise wizards like Merlin, summer is here again and interest in micros wanes as citizens of my fair land rush out into the sun.

But experts – and even wizards – have been known to be wrong.

It is at times like this that you can spot adventure fanatics. They are the people who rise some time after 10am, have pale faces and dark rings under their eyes.

They wander aimlessly around in the midday sun muttering strange incantations like "Try UNLOCK GATE WITH RUSTY KEY", and have permanent bald scratch marks on their faces.

There are no new releases to report this month, but rumours filtering through from my vassals indicate some exciting surprises in store for this autumn.

Perhaps now is the time to upgrade your Electron to 64k with a Slogger Master Ram Board, to make the most of the goodies to come, and delight in the odd BBC Micro Level 9 adventures.

A number of readers have written with thanks for the recent series of *mar* have published for *T* *Kingdom Valley* (TKV). They have obviously helped many adventurers make progress in this complex graphic game.

However, Mrs Madeline

Charlton, of Newcastle-on-Tyne, writes:

"I am a complete beginner to adventuring, starting on Twin Kingdom Valley, and at present keep getting walloped by various nasties, ending with the infuriating "You are dead. Bye bye!" message.

At this point I cannot get the program to do anything, and have to reload. Is there any way round this irritating waste of time?"

John Rogerson, among many, echoes this complaint concerning the failure of the save game facility. For the thousands of you who have been struggling with TKV, dear Bill Trevelyan once again comes to the rescue. He explains the problem and provides a remedy.

It appears that the Electron game is a modified version of the program written for another machine, and in this, the 18-byte parameter block for Osfile was located at &35EE. The programmer evidently decided to relocate this at &B00, since the

program has 18 bytes of junk at &B00-&B11. But then he forgot to alter the addresses in the body of the program.

The result is that every time "SAVE or "LOAD is entered, 18 bytes of the game's running program at &35EE onwards are wiped out, and it crashes.

All that is required is to alter the addresses to refer to a parameter block at &B00, and the game works perfectly. To do this, you load the main program VALLEY – it runs from &B00 to &5C40 – and enter the following corrected slab of code:

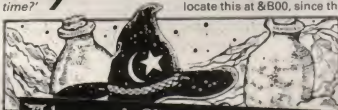
```
EP2=0050
LDA#0:LDX#11:STA000,X
[DEX;0PLB5C:LDX#000
[STA000:LDX#0F:JSR097
[TSX:INX:STX000A:LDX#0
[STX000:LDX#0F:JSR097
LDA#0F:STA000:LDX#043
[STA000F:LDX#0:STA000A
[STA000:LDX#0F:LDX000A
[STA0002:LDX#000:STA0003
LDA#0:STX0000:LDX#000
[STX0001:LDX#0:LDX#000
[JMPLFFD:LDX#0F:JSR0BC3
LDA#0F:TXS:LDX#009
[JSR0BC3:LDX#0F:LDX#0FF
[STA0006:0NEG0A5
```

Then save the corrected program.

This month I begin a series of maps of mazes which I hope will enable a number of readers to extricate themselves from dead ends in some adventures.

We start off with a map of the coloured rooms and iron passages in *Sphinx Adventure*. Next month I will feature a map of the Witherton maze in *Project Thesus*.

Until machine code is easier on the eye, happy adventuring.



Adventurer's Glossary (continued from last month)

Ice sheet: Must surely be crossed.

Ice wall: Try breaking it.

Idol: A treasure or perhaps an important hiding place.

Imp: Mischievous and cannot be trusted.

Inn: A source of liquid refreshment and information. Try looking and listening.

Iron door: May need an iron key.

Iron grating: A key or a saw may be needed.

Island: A boat or a raft must be found or constructed if you wish to travel there.

Jail: There is often no escape. However, a trapdoor or a key may help in your plight.

Jelly fish: Dangerous – must be killed or avoided.

Jester: A fool indeed but a source of wisdom most profound. Perhaps he needs a joker.

Jewelry: Just a valuable treasure.

Problems Solved

I begin by thanking Steven Wyeth for his solution to **Project Thesius**. Yes, Steven, next month I will publish a list of some BBC Micro adventures which run with Slogger's Master Ram board.

I must also thank A. Davidson of County Durham for his superb solution to **Stranded**, which I will feature in a future Hall of Fame.

I received a message on the castle fax machine from Alan Buckley who cannot cross the lake in **Sphinx Adventure**. I answered this

problem in the column last month Alan.

Andrew Mendham should travel N, E, N, S, E, W, E, S, N, S, E, W, E, S, N, S, from the pirate's hide-out if he wishes to meet the Sphinx.

Tim Wye helpfully points out that to begin **Savage Island 2** you must type the password: SAY 123.

Tim, Wai lin Li, My Hoa Lam and Lisa Hudson all wax lyrical about Larsoft adventures. I agree wholeheartedly with them that they are the best available

for the price.

However, they experience difficulty in **Wychwood**. The problem is easily solved if they throw the flag at the bull then clear the leaves and examine the hollow.

Tom Kols asks where to find Mr Video in **Dodgy Geezers**. He also asks whether the pickaxe is needed.

Mr Video will meet you in the snooker hall and you will be arrested if you carry the pickaxe around town, but it is needed later in part 2. So, decide where to stow it. You

must choose Tricks, Mr Video and Soapy for your gang.

The password to part 2 is an anagram of TREV and PETE.

Finally, in **American Suds**, Peter, David and Ross Jenkins must use the flares from the wardrobe to attract the helicopter.

Examination of the desk will reveal a pin which can be used to draw blood to sign the contract! Look under your seat on the aircraft to find the tool to make your escape.

Readers' Hall of Fame

Village of Lost Souls Peter Youde (continued from last month)

Get some of the objects requested by going SE, NE, OUT, N, N, N, IN, IN, E, NW. Wear the necklace then SE, W, OUT, OUT, SW, S, E, NE, E, N, NE. Examine the floor, get the crucifix then SW, W, S, NW, SW, W, IN.

Fill the chalice with water, then go SW, NW, and put the crucifix on the altar. Remove the necklace and put that on the altar then drop the staff.

Explore the manor gardens. SE, NE, NE. Get the paddle, then go SW, OUT, E, NE, E. Get the cheese, then go NW, SW, SW, W, W, W, W, W, E, E, E, E, S, W. Drop the tin chalice and hammer. Go NE, sniff the cheese, IN, GET RELIQUARY, OUT, drop the cheese, W, W, S, SE, get the goat, NW, N, W, get the spade.

Dig in the kitchen garden. W, W, S, S, S, S, DIG, DIG, DIG, and get the garlic. Now visit the church crypt. N, N, N, N, N, NE, E, E, E, SE, W, IN, N, DOWN, DOWN. Eat the garlic and get the ring then return the reliquary to the altar with UP, UP, S, SW, NW. Put the reliquary on the altar and get the staff.

Before visiting the water mill go SE, NE, OUT, E, NE, NE, UP, NE, JUMP DOWN, drop the goat, go S, get the coracle and go N, IN, GET ROPE, OUT. Make your way to the occult laboratory.

Go SW, then drop the paddle and coracle. SW, E, S, GET MALLET, N, NW, SW, SW, W, S, S, UP, GET MATTRESS, DOWN, SW, W, W, IN, NW, S, IN, Tap the third barrel with the mallet, then drop it and go IN, READ GRIMOIRE, BREAK STAFF, DROP JUNK.

Call the Demon by getting the chalk, and drawing a pentacle. Say AZAPHAS, drop the gloves and chalk. Walk out and fall in the pit. OUT, OUT, E. Use the gauntlets to free yourself and collect the other items for the altar.

Drop everything, wear the gauntlets, push the stone and remove the gauntlets. Wear the band, get the spade,

ring, rope and mattress. Go in, wear the circlet and get the sceptre.

Return these items to the altar. UP, S, drop the gauntlets, spade, mattress, rope and ring. Go SW, OUT, N, NE, E, E, SE, W, IN, SW, NW, remove the circlet and put it and the sceptre on the altar.

The Stolen Lamp – Paul Davies

Go South, West, South. Buy the carpet and go North, East, North, East. Drop the carpet and hand-grenade and go West, South, West, West, North, West. Read the message and go East, East, South, East, East, North, East.

Get the hand-grenade and carpet and go West. Say the secret word and go North, Down. Get the sledgehammer and say the secret word. Go South, South, East, Down.

Get the diamond and go North, East. Thump the statue and go East. Get the red-herring and go East. GET GOLD, West, West, West, North. Get the bracelet and the girl. Smash the column and get the box. Go East, East. Get the ruby and go West, West, North and drop the box.

Pull the pin and drop the grenade. Go South and look. Go North and drop the carpet. Get the key and go East, East. Get the silver and go East, then drop the bracelet.

Smash the enchantress and get the bracelet. Go North and get the necklace. Go North and get the mirror. Go South, South, West and unlock the door. Go to the bathroom and drop the girl.


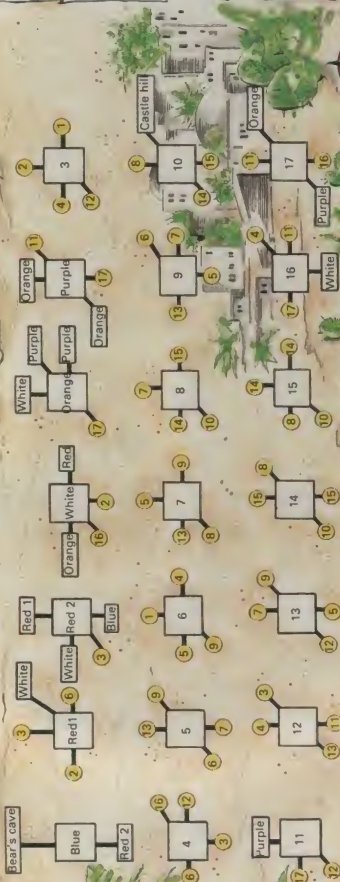
Go to the door and go North, North. Get the pearls and go South, West and get the ring. Go West and get the emerald. Drop the herring and go North. Get the lamp and go South, East, East, South, West, West.

Get the carpet and go South, South, South. Say the secret word and go West, North, Down, North, West, West, South, West. Get the goblet and smash the pick-pocket. Go East, South, East, East, North, East.

Success is yours!

Maze No. 7

Coloured Rooms and Iron Passages





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HELP!

Contrary to what the critics used to say the Electron market is now established and respected. There are a variety of very good products available already (some better than the BBC) but I'm sure there are plenty more possible. Please contribute by writing to Helpline at our new address, giving your idea, and why you think it's suitable for the Electron. You never know you may receive a reward in the post.

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Electron User July 87

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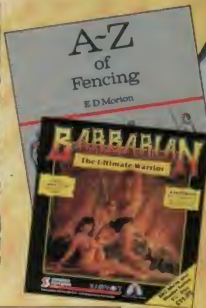
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Meet the BARBARIANS

Barbarian – the Ultimate Warrior is now available for the Electron User. To commemorate its arrival, Superior Software offers you a chance to add this game to your collection. For the first prize winner there is also the opportunity of a lifetime – to meet the Barbarian and Australian Rugby Football teams and to see them in action. The second prize is a book full of facts and history about swords and the art of fencing. There are also 30 runners-up prizes in this superb competition – making a total value of over £500

WHAT YOU HAVE TO DO

Below are the silhouettes of five swords and eight possible names for them – match these and you could win one of 32 fantastic prizes. Photocopy or cut out your completed entry form and send it to arrive no later than July 29. The winners will be the first correct entries pulled from the sack.



1st Prize Two tickets to see the Barbarians play the Australian Rugby Football Team at Cardiff Arms Park on November 26. See the match and meet the teams after this prestigious centenary celebration game.
PLUS a copy of Barbarian
PLUS any three Superior games of your choice

2nd Prize A book to tell you all about fencing: The Martini A-Z of Fencing by E.D. Morton.
PLUS a copy of Barbarian
PLUS any two games from the Superior catalogue

30 Runners up prizes Any game of your own choice from release, Barbarian, or any golden oldie you want.



- | | |
|------------------|-----------------|
| A. Sabre | E. Epee |
| B. Main Gauche | F. Roman sword |
| C. Rapier | G. Colichemarde |
| D. German Dusack | H. Foil |

ENTRY FORM

ANSWERS

If you think that sword 1 is a colichemarde then put G next to the number 1.

1	4
2	5
3	

Name _____

Address _____

Postcode _____

Send your completed entries to: **The Barbarian Competition, Electron User, Europa House, Adlington Park, Adlington, Macclesfield SK10 4NP.**

More power under your bonnet

CHRIS NIXON gives the new Advanced Plus 2 rom from Pres a trial spin

SINCE the rights to produce the Plus 1 were signed over to Pres – then ACP – way back in the mists of time, wonderful things have happened to Acorn's unwanted offspring.

And now comes the arrival of the new AP2 rom from Pres. It's a complete replacement for the existing Plus 1 rom, and like all of Pres's other products it's been well worth waiting for.

Those of you who have heard about and envied the BBC Master's enhanced operating system need pine no more, for a good selection of its star commands – and some new ones – are now available for your Electron.

These extra commands are made possible due to the fact that the original Plus 1 rom uses only about 3k of the 8k rom. This means that there were five whole kilobytes of space going to waste, and Pres has finally put it to good use.

A quick session with a screwdriver sees the AP2 firmly installed inside your Plus 1. It sits in the same socket as the original rom, with the half-moon notch facing in the same direction, toward the right.

When your system is bolted together again and the power turned on, typing

*HELP +1 shows you just what's now under the bonnet of your Electron, and a pretty impressive list it is too.

You can now disable and re-enable any roms other than the default language or the Plus 1 rom itself, using the Master-like *UNPLUG and *INSERT commands. Furthermore, the language to be selected upon the next Control+Break may be set using *LANG.

Typing *ROMS generates a list of all your roms, with an inverted U beside those which are currently unplugged. The default language as set by *LANG – normally Basic – is indicated by an inverted asterisk.

The contents of any rom can be saved to disc or tape, and loaded back into sideways ram, if present. What is most impressive about the AP2 is that it automatically copes with all of Pres's various sideways ram variations, including the AQR, ABR, ASR and the new AP7.

If you want to load a rom image, you don't even need to specify which bank it's to go in, unless you want to – the AP2 will search the rom sockets and prompt you when it finds a bank of ram.

While on the subject of sideways ram, the AP2

includes some invaluable utilities normally available only in extra service roms. *LOCK will write-protect the selected bank of sideways ram, while *UNLOCK performs the reverse process, allowing you to write information again.

And to save a bit of time, all ram banks can be globally locked or unlocked, with *LROMS and *UROMS. Using either of these commands will produce a *ROMS display, where any unlocked bank will have an R shown beside it.

The AP2's repertoire of disc handling commands should bring a tear of joy to those of you who are used to digging out the utility disc whenever a !BOOT file needs to be built, or a *DUMP is required.

Furthermore, there is a built-in ADFS formatter – *FORMAT – which detects whether you have ADFS version 1.00, and will accordingly generate the ZYSysHelp file. If you have a more up-to-date version, this file will be omitted from the formatted disc.

There's also the vital *VERIFY command which allows you to test the integrity of suspect discs, and there's even a version of the formatter which will automatically verify the disc

after formatting, called *VFORMAT.

Even the humble *DUMP command is greatly enhanced over other versions. It automatically takes the current screen mode into account, and generates a dump which will always fill the display horizontally, but never exceed the current screen width – even in Modes 2 and 5.

Perhaps the most useful function as far as games players are concerned is the *KILL command. This completely disables the Plus 1, and even a Control+Break won't re-enable it.

I use *KILL all the time now, and find it invaluable when there are games to review which would normally crash due to the presence of the Plus 1.

Tape users aren't left out either. Included in AP2 is a software fix for the old tape loading problems when in high memory modes. Although it won't cure everything, you'll find tape loading in general to be more reliable with the AP2 present.

Overall, I was most impressed with the AP2. It now seems such an integral part of my Electron that I'm not sure what I'd do without it – I would hate to go back to manually disabling the Plus 1, for instance, and it's a matter of course now to *UNPLUG any roms which are interfering with a particular project.

As a complete upgrade for your Plus 1, £12.65 seems a small price to pay for what is much more than an ordinary third party utility rom. The AP2 is the definitive Plus 1 rom, and should have been written by Acorn itself in the first place.

PRES AP2 Support ROM 1.13

ADC/Printer/RS423 drivers

*HELP +1 for * commands

*AQRPAGE <page>

*BUILD <file>

*DUMP <file>

*FORMAT <ADFS drive> (<SML>)

*INSERT <bank>

*KILL

*LANG <bank>

*LIST <file>

*LOADROM <file> (<bank>) (L)

*LOCK <bank>

*LROMS

*ROMS

*SAVEROM <file> <bank> (S)

*TYPE <file>

*UNLOCK <bank>

*UNPLUG <bank>

*UROMS

*VERIFY <ADFS drive>

*VFORMAT <ADFS drive> (<SML>)

AP2's command list

Product: Advanced Plus 2

Price: £12.65

Supplier: Pres, 30 Guildford

Road, Lightwater, Surrey

GU18 5SN.

Tel: 0276 72046

Europress

G R O U P

The Europress Group is one of Britain's most dynamic companies. Its divisions include Database Software, Mandarin Software and the publishers of this magazine, Database Publications.

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The position involves day to day supervision of projects from their early stages through to launch, including liaison with in-house and third party programmers.

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Programmer for Maintenance/Conversion Work

Applicants should be familiar with 8 bit micros and have a knowledge of programming in Z80 and 6502 machine code as well as Basic. Experience of 16 bit machines is an advantage but not essential. But a willingness to learn other languages is vital.

The position initially involves product maintenance/conversion work although in due course there will be opportunities to work on exciting new products now being planned. Salary commensurate with experience.

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**THE
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TOP 10

ELECTRON SOFTWARE

THIS MONTH	LAST MONTH	TITLE (Software House)	PRICE
1	1	SOCCER BOSS <i>Alternative</i>	1.99
2	3	STAR FIGHT <i>Alternative</i>	1.99
3	2	COMBAT LYNX <i>Alternative</i>	1.99
4	4	FIVE STAR GAMES <i>Beau Jolly</i>	9.95
5	5	PRO GOLF <i>Atlantis</i>	2.99
6	•	PSYCASTRIA <i>Alternative</i>	1.99
7	9	WAY OF THE EXPLODING FIST <i>Mastertronic</i>	1.99
8	•	FOUR GREAT GAMES 3 <i>Microvalue</i>	3.99
9	6	FOUR GREAT GAMES <i>Microvalue</i>	3.99
10	•	AROUND THE WORLD IN 40 SCREENS <i>Superior</i>	6.95

Compiled by Gallup/Microscope

Budget house Alternative really takes the chart by storm again this month, holding the top three positions. Superior's Around the World re-enters at 20 and is its only representative; perhaps the long-awaited Barbarian will improve the situation.

Four Great Games Three makes its debut – and you can read what our reviewer thinks of this, as well as a review of Way of the Exploding Fist in this issue of *Electron User*.

WHIST is a two-player version of the popular card game **Knock-out Whist** in which the **Electron** takes on the role of the other player. Even if you already know the rules, read on – there are a variety of ways to play.

This version is played over a total of seven rounds. In round one, seven cards each are dealt, and the game is started by the player whose name is shown next to the word **Lead**.

A card is played by typing the number shown beneath it, and the opponent has to match this with a higher value card of the same suit to win the trick. Whoever wins a trick becomes the lead for the next go.

If the opponent has no card of the same suit, then two choices are possible. Any other card may be played down, in which case the opponent automatically wins that trick.

But if the card is a member of the current trump suit – indicated at the middle left of the screen – then whoever placed the trump automatically wins that trick, unless it was placed first and the opponent counters with a higher trump.

The player beginning a round has the choice of trumps for that round – the computer will decide for itself, and will tell you its choice. When it is your turn to choose trumps, simply press the first letter of the desired suit. Full prompts are given and your choice is then displayed.

The winner of each round is the player with the most tricks. If both players have an equal number, the pack is cut at random as a tie-break, the higher card deciding the winner.

After the first round, if a player completes any subsequent round without

scoring, then the whole game is automatically given to the other player. But note that no one can lose in round one, which is essentially a practice round.

The winner of the game, unless won by default, is the player who has won the most rounds. The computer plays quite intelligently, but if you think carefully – and luck is on your side – you should be able to at least draw most of the time.



IT'S A KNOCKOUT

Beat the computer's hand in this full-blown whist simulation from **ROBERT CHARLTON**

SOME USEFUL HINTS

- When laying your first card, it's advisable to place one of a higher value.
- If you have no trumps in your hand at all, and do not have a card of the same suit as the computer, lay the lowest value card of any suit that you have – this saves your better cards for the next go.
- Try to save your trump cards – don't use them all up at the start unless it's vital.
- When selecting trumps, choose the suit which matches the majority of cards in your hand.

And finally, remember that Aces count high – that is, more than a King. So fix your eye-shade firmly on your forehead, and settle down to some fast dealing.

VARIABLES

C%	Number of cards in round
D%	Number of tricks you have
E%	Number of computer's tricks
F%	The "lead" player
P%	Practice round flag
R%	Current round
T%	Trump suite
W%	Winner of the round
DS()	The deck of cards
HS()	Holds both hands

PROCEDURES

shuf	Shuffles the pack
huma	Gets player's card
comp	Gets computer's card
deal	Deals random cards
disp	Prints the screen
draw	Draws a card
admn	Decides the winner
cut	Cuts the pack

Turn to Page 51 ►

TIMES are hard in Woody Warren. Last month's drought virtually destroyed the local carrot crop, and the small rabbit colony now faces starvation.

And to make things worse, the evil Baron de Bunniford – always one to look out for himself – ordered his hench-rabbits to hoard an immense pile of carrots in his strongrooms as soon as the drought set in.

Desperate times call for desperate measures, so the elder rabbits settled on a plan to recover their vital food stocks.

You, the youngest and fittest in the colony, must breach the Baron's fortified warren and bring back as many carrots as you can carry.

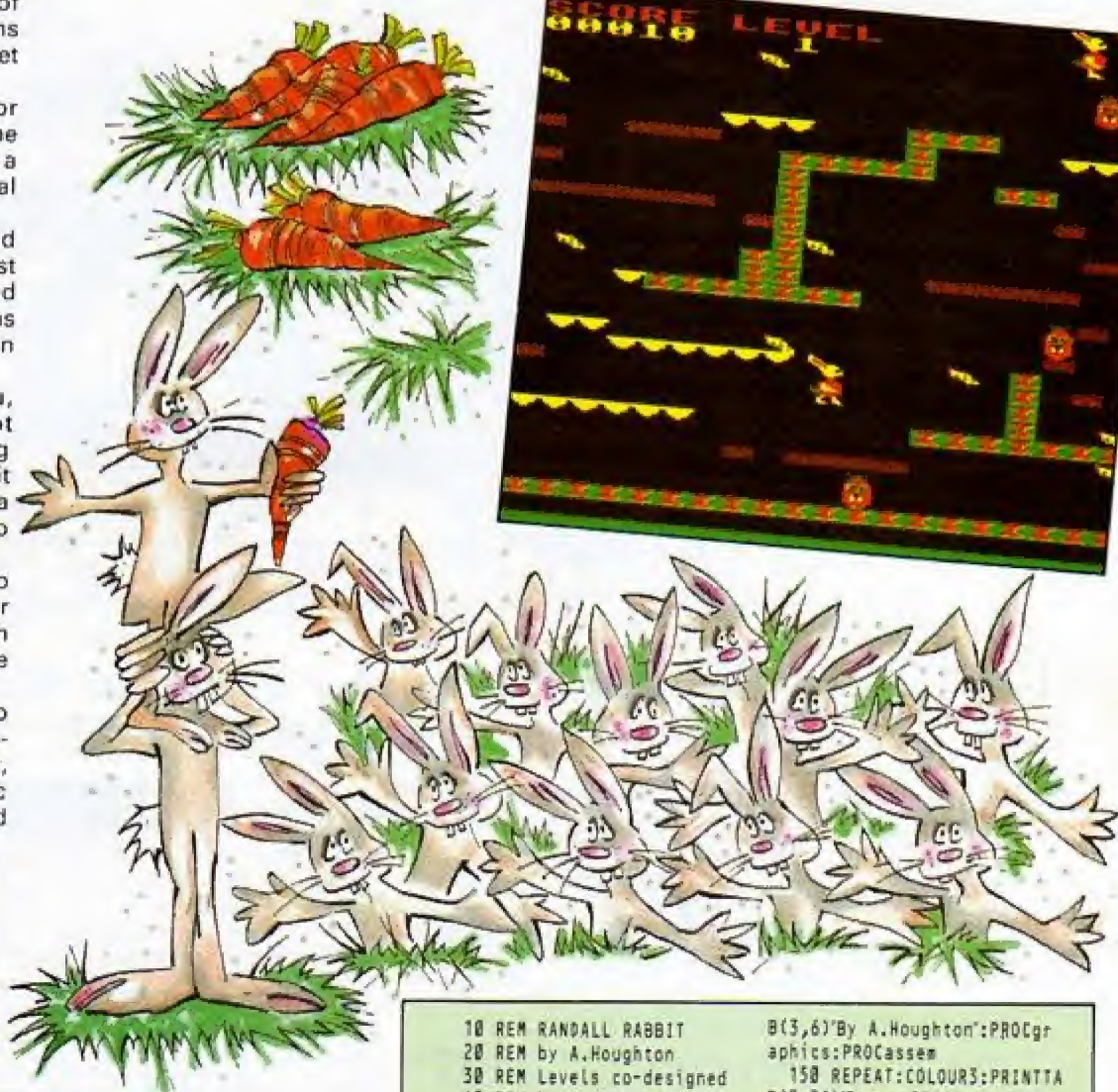
But unknown to you, armies of deadly carrot monsters are standing guard over the Baron's illicit hoard, just waiting for a tender young bunny to wander into their clutches.

You can leap from level to level, dodging under or over the carrot monsters to reach your booty, but beware the disintegrating platforms.

If you stand on one for too long it will disappear, plunging you to the warren floor, where the cannibalistic Baron will have you served up as rabbit stew.

Carrot quest

Save the starving rabbits in this fast action arcade game by **ANTHONY HOUGHTON**



CONTROLS

Z Left
X Right
Shift Jump

VARIABLES

lives Number of lives left
level Current level
round Number of missions completed
vmon Vertical position of monster
hmon Horizontal position of monster
carrots Number of carrots gathered

PROCEDURES

assem Assemble machine code
screen Set up the next level
hmon Set up the horizontal monster positions
vmon Set up the vertical monster positions
bonus Award bonus score
won Get ready for next round

```
10 REM RANDALL RABBIT
20 REM by A.Houghton
30 REM Levels co-designed
40 REM by A.J.Docherty
50 REM (c) Electron User
60 IF PAGE<1901 THEN 110
70 *FX21,0
80 *K,0 *T,1MFOR1X=0TO(10
P-PAGE)STEP4:1X!&1900=1X!PAG
E:NEXTIMPAGE=&1900:MOLDIMRUN
IM
90 *FX138,0,128
100 END
110 *FX16
120 *FX229,1
130 ENVELOPE1,1,50,-20,10,
4,10,10,126,0,0,-126,126,126
:ENVELOPE2,1,10,-1,0,5,90,0,
126,0,0,-126,126,126:ENVELOP
E3,1,2,5,0,5,90,0,126,0,0,-1
26,126,126
140 MODE5:VDU23;8202;0;0;0
;19,3,2;0;:PRINTTAB(3,4)"RAN
DALL RABBIT":COLOUR2:PRINTTA
B(3,6)"By A.Houghton":PROCgr
aphics:PROCassem
150 REPEAT:COLOUR3:PRINTTA
B(0,31)"Press SPACE to play"
:REPEATUNTILGET=32:level=1:
round=0
160 ?speed=245:lives=5:?sc
ore=0:score?1=0:REPEAT:PROCc
reen:CALLmain:IF?carrots=10
PROCbonus
170 IF?carrots=10ANDlevel>
5PROCwon:UNTIL0 ELSEIF?carro
ts=10UNTIL0
180 SOUND&11,2,80,13:AX=1r
a AND&FFFF:0AX=1rg AND&FFFF:
FORMX=0T02:FORNX=0T07:*FX19
190 FORXX=0T016STEP8:ADX=A
X+NX*&140+NX+XX:?ADX=?AD%EO
R(?0AX+NX*24+NX+XX):NEXT,,
200 FORNX=1T01000:NEXT:liv
es=lives-1:UNTILLives=0
210 COLOUR2:PRINTTAB(4,14)
SPC(12)TAB(4,15)"GAME OVER
TAB(4,16)SPC(12):GCOL3,129
```



```

:CLG:CLG:UNTIL0
220 DEFPROCwon:GCOL3,131:C
LG:GCOL0,128:CLG:COLOUR2:PRI
NTTAB(2,10)'Congratulations!
""TAB(3)'You have won!':COL
OUR3:PRINTTAB(1,14)'But it w
on't be so""TAB(3)'easy thi
s time!'
230 round=round+1:IFLives<
7Lives=Lives+1
240 TIME=0:REPEATUNTILTIME
>200:GCOL3,130:CLG:GCOL3,129
:CLG:GCOL3,131:CLG:IF?speed<
255 ?speed=?speed+1
250 Level=1:ENDPROC
260 DEFPROCbonus:FORN%50T
O150STEPS:SOUND1,-15,N%,1:NE
XT:FORN%1T05*Level+25*round
:CALLInsc:CALLpscore:SOUND&1
0,-15,6,1:NEXT:Level=Level+1
:ENDPROC
270 DEFPROCscreen:CLS:COLO
UR1:PRINTTAB(0,1)'SCORE LEVE
L':CALLpscore:PRINTTAB(8,2);
Level+round*5
280 IFLives>1FORL%1TOLive
s-1:XX=40-3*LX:YX=0:CALLcalc
:los=lad-83C0:lod=8990:XX=3;
YX=24:CALLprint:NEXT
290 RESTORE(300+40*Level)
300 COLOUR2:COLOUR128:READ
CX:FORN%1T0CX:READXX,YX,LX:
PRINTTAB(CX,YX+3)STRING$(LX,
CHR$(134)):NEXT
310 COLOUR3:COLOUR129:READ
CX:FORN%1T0CX:READXX,YX,LX:
PRINTTAB(CX,YX+3)STRING$(LX,
CHR$(135)):NEXT
320 COLOUR1:COLOUR128:READ
CX:FORN%1T0CX:READXX,YX,LX:
PRINTTAB(CX,YX+3)STRING$(LX,
CHR$(132)):NEXT
330 FORN%1T010:READXX,YX:
XX=XX+2:CALLcalc:los=lad:lod
=8A20:XX=1:YX=16:CALLprint:N
EXT
340 FORN%1T047:N%?hmon1=0
:NEXT
350 READMX:IFMX<>0FORN%1T0
OMX-1:READLX,RX,VX:PROChmon:
NEXT
360 READMX:IFMX<>0FORN%1T0
OMX-1:READHX,TX,BX:PROCvmon:
NEXT
370 ?rx=0:?ry=24:?rf=0:?rs
=0:?rd=0:?rv=0:lr=890079C0:
!os=!ra:XX=3:YX=24:CALLprint
:ENDPROC
380 DEFPROCvmon:XX=HX:YX=T
X:CALLcalc:los=lad:lod=8A30:
XX=2:YX=16:CALLprint
390 vmon1?(NX*12)=HX:vmon1?(NX*12+
1)=TX:vmon1?(NX*12+2)=RX:vmo
n1?(NX*12+3)=TX:vmon1?(NX*12
+4)=1:ENDPROC
400 DEFPROCchmon:XX=LX:YX=V
X:CALLcalc:los=lad:lod=8A30:
XX=2:YX=16:CALLprint
410 hmon1?(NX*12)=LX:hmon1?(NX*12+
1)=TX:hmon1?(NX*12+2)=RX:hmo
n1?(NX*12+3)=VX:hmon1?(NX*12
+4)=1:ENDPROC
420 DATA6,3,14,1,6,4,3,17,
5,3,1,17,2,3,18,6,0,22,6
430 DATA18,12,4,3,12,5,1,8

```

```

,6,5,8,7,1,15,7,2,8,8,1,8,9,
1,8,10,1,8,11,1,7,12,2,7,13,
2,4,14,7,16,18,1,16,19,1,16,
20,1,16,21,1,13,22,7,0,27,20
440 DATA13,0,5,1,3,5,3,0,7
,1,0,9,6,17,9,1,7,10,1,18,11
,2,13,13,5,18,15,1,17,17,1,0
,19,1,18,19,1,7,24,6
450 DATA7,0,0,2,19,3,19,7,
9,11,1,12,8,17,14,18,19,21,1
9,23,3,2,38,1,0,34,15,12,34,
25,0
460 DATA14,8,4,5,2,4,5,14,
4,6,14,6,4,10,16,1,6,17,2,0,
18,6,11,18,1,10,21,1,11,25,1
,0,27,3,9,27,2,12,27,2,15,27
,5
470 DATA20,4,5,1,4,6,1,18,
6,2,4,7,1,4,8,4,4,9,1,8,9,1,
4,10,1,8,10,1,13,10,7,8,13,1
,13,13,1,0,14,6,8,16,1,13,16
,1,8,19,1,13,19,1,8,22,1,13,
22,1,8,25,1
480 DATA21,0,6,1,3,8,1,0,9
,1,0,12,1,12,13,1,9,14,2,7,1
5,1,14,15,1,16,15,3,19,16,1,
16,17,1,4,19,2,14,19,1,18,19
,1,6,21,2,18,21,2,19,22,1,3,
23,2,6,25,2,19,25,1,4,27,1
490 DATA2,0,17,0,19,5,19,7
,14,12,19,11,0,15,17,16,0,22
,5,5,2,18,38,8,10,38,23,2,4,
5,12,30,11,21
500 DATA1,0,27,3,7,6,20,1,
6,21,1,6,22,1,6,23,6,11,20,1
,11,21,1,11,22,1,56,0,5,2,5,
5,1,8,5,2,12,5,2,16,5,4,0,6,
1,2,6,1,4,6,1,6,6,1,8,6,1,10
,6,1,12,6,1,14,6,1,16,6,1,18
,6,1,0,7,2,4,7,3,8,7,2,12,7,
2,16,7,1,18,7,1,0,8,1,2,8,1,
4,8,1,6,8,1
510 DATA8,8,1,10,8,1,12,8,
1,14,8,1,16,8,1,18,8,1,0,9,1
,2,9,1,4,9,1,6,9,1,8,9,2,12,
9,2,16,9,1,18,9,1,0,11,1,0,1
3,1,2,15,4,8,15,2,11,15,2,14
,15,2,18,15,2,19,17,1,16,19,
2,10,20,1,1,21,5
520 DATA12,21,1,14,21,1,0,
23,2,2,25,2,18,25,2,3,27,17
530 DATA1,1,5,1,8,1,12,1,1
8,1,19,8,12,11,8,21,19,22,9,
25,0,3,14,0,21,26,10,25,30,0
,13
540 DATA5,9,20,2,7,21,2,6,
22,1,0,27,8,19,27,1
550 DATA26,3,4,1,6,4,1,17,
4,1,3,5,1,6,5,1,17,5,1,0,6,4
,6,6,12,6,7,1,6,8,1,6,9,1,6,
10,1,7,16,1,11,16,1,14,16,1,
17,16,1,11,17,1,14,17,1,17,1
7,1,11,18,1,14,18,1,17,18,1,
11,19,1,14,19,1,17,19,1,11,2
0,7
560 DATA30,11,3,2,0,4,3,4,
4,2,18,4,2,4,6,2,18,6,2,4,8,
2,18,8,2,0,10,6,7,10,2,13,10
,2,18,10,2,10,12,3,16,12,2,0
,13,1,2,15,2,0,17,1,9,17,2,1
2,17,2,15,17,2,18,17,2,2,19,
2,19,19,1,0,21,1,19,21,1,2,2
3,4,19,23,1,9,25,2,12,25,2,1
5,25,5
570 DATA0,5,1,5,2,5,7,7,0,
15,7,15,12,18,15,18,0,19,19,
26,3,14,32,4,8,36,13,16,36,2

```

```

6,1,2,11,25
580 DATA12,7,7,1,5,8,2,9,8
,1,6,3,1,0,24,1,0,17,2,14,3,
6,8,4,5,15,7,3,9,7,1,12,21,5
,19,27,1
590 DATA30,10,3,1,10,4,1,5
,3,1,4,4,2,4,5,1,4,6,1,4,7,1
,5,12,3,4,16,9,2,20,1,2,21,1
,2,22,1,6,20,1,6,21,1,6,22,1
,2,23,5,10,7,2,11,10,1,18,9,
1,17,11,1,10,13,1,10,14,1,10
,15,1,16,13,1,16,14,1,16,15,
1,14,16,3,10,20,1,10,23,1,10
,24,1
600 DATA19,19,5,1,0,4,1,11
,3,2,2,6,2,0,8,1,0,10,1,2,12
,3,9,13,1,3,20,3,7,22,1,7,24
,3,0,27,17,19,5,1,11,13,2,19
,13,1,18,15,1,18,18,1,18,21,
1,11,24,1
610 DATA0,0,5,7,0,21,4,22,
3,7,17,0,11,14,12,17,19,21,1
3,22,3,10,36,5,0,32,18,4,28,
25,4,2,0,15,16,7,14,26,7,16,
34,12,26
620 DEFPROCassem:DIMGX2000
,table 60:FORN%1T027:table!
(NX+2)-NX+8140+85BC0:NEXT:IF
INKEY=256=1 timer=829F ELSEt
imer=82AB
630 os=870:od=872:ns=874:n
d=876:ad=878:FORP=0T02STEP2:
PX=QX:COPTP
640 .sprite STX&7A:STY&7B:
JSRprint:LDAns:STAos:LDAns+1
:STAos+1:LDAnd:STAod:LDAnd+1
:STAod+1:LDX&7A:LDY&7B
650 .print STY&80:.prlp1 L
DY&80:.prlp2 DEY:LDAd(od),Y:E
OR(os),Y:STA(os),Y:CPY@0:BNE
prlp2
660 LDAod:CLC:ADC&80:STAod
:LDAd+1:ADC@0:STAod+1:LDAs
:CLC:ADC&840:STAos:LDAs+1:A
DC@1:STAos+1:DEX:BNEprlp1:RT
S
670 .calc LDA@0:STAad+1:TX
A:LDX@3:.rolp ASLA:ROLad+1:0
EX:BNErdlp:STAAd:TYA:ASLA:TA
Y:LDAtable,Y:CLC:ADCad:STAad
:LDAtable+1,Y:ADCad+1:STAad+
1:RTS
680 .check JSRcalc:LDY@0:L
DA(ad),Y:RTS
690 .carrots EQU00:.score
EQU00:.fall EQU00:.speed EQU
00
700 .dead EQU00:.vert EQU0
0:.rx EQU00:.ry EQU00:.rf EQ
U00:.rs EQU00:.rd EQU00:.rv
EQU00:.ra EQU00:.rg EQU00
710 .jms EQU00:11:EQU03:EQ
UW20:EQU04
720 .avrab LDAvert:BEQchkku
ndr:CMP&FF:BEQchkundr:DECve
rt:BEQatoj:LDAd&FF:STARv:JMP
chkun2:.atoj LDA&FF:STAvrt:
LDAd&FF:STARv:JMPnkjm
730 .chkun2 LDxrx:INX:LDAr
y:CLC:ADC@3:TAY:JSRcheck:CM
P&FF:BEQjmf1r:CMP&F0:BEQjmf
1r:CMP&5:BEQjmf1r:JMPnkjm:J
mf1r LDA&FF:STAvrt:LDAd@0:S
TArv
740 .chkundr LDxrx:INX:LDAr
y:CLC:ADC@3:TAY:JSRcheck:CM
P&FF:BEQrabmv:CMP&F0:BEQra

```

```

bmrv:CMP&5:BEQdissolve:INCfal
l:LDAd@1:STARv:LDavrt:BNenkj
m2:LDAd@0:STAd:.nkjm2 JMPnkj
m
750 .dissolve LDxrx:INX:LD
Arv:CLC:ADC@6:TAY:LDAd@31:JSR
&FFEE:TXA:LSRA:JSR&FFEE:TYA:
JSR&FFEE:LDAd@17:JSR&FFEE:LDAd
@1:JSR&FFEE:LDAd@17:JSR&FFEE:
LDAd@128:JSR&FFEE
760 LDAd@135:JSR&FFF4:DEX:C
PX@127:BNEntgon:LDX@32:.ntgo
n TXA:JSR&FFEE
770 .rabmv LDafall:CMP@7:B
CCnsplt:STAddead:RTS:.nsplt L
DA@0:STAfall:STARv:STAvrt:S
TAd:LDAd@81:LDX@89E:LDY&FF
:JSR&FFF4:TYA:BEQnk1f:LDAd&FF
F:STAd
780 .nk1f LDAd@81:LDX@80D:
LDY&FF:JSR&FFF4:TYA:BEQnkri
:INCrd
790 .nkri LDAd@81:LDX@8FF:
LDY&FF:JSR&FFF4:TYA:BEQnkjm
:LDAd@3:STAvrt:LDAd&FF:STARv
:LDAd@7:LDX@jms MOD256:LDY@j
ms DIV256:JSR&FFF1
800 .nkjm LDArx:CLC:ADCrd:
CMP&FF:BEQstoph:CMP@38:BEQs
toph
810 LDxrd:CPX@1:BNEntkri:
CLC:ADC@2:.ntckri TAX:LDYry:
STX&80:STY&91:JSRcheck:CMP@8
FF:BEQstoph:INC@91:LDX&80:LD
Y&91:JSRcheck:CMP@8FF:BEQsto
ph:INC@91:LDX&80:LDY&91:JSRc
heck:CMP@8FF:BEQstoph
820 LDArx:CLC:ADCrd:STARx:
JMPnstph
830 .stoph LDavrt:CMP&8FF
:BNEntstph:LDAd@0:STAd:.nstph
LDArv:CLC:ADCrv:CMP@25:BNEnt
tb:STAddead:.ntb CMP&8FF:BEQj
tos:LDYrv:CPY@1:BEQnbnce:LDX
rx:INX:TAY:JSRcheck:CMP&8FF:
BNEntbce:.jtos LDAd&8FF:STAv
rt:STARv:JMPbnce
840 .nbnce LDArv:CLC:ADCrv
:STArv:.bnce
850 LDArv:STAos:LDArv+1:ST
Aos+1:LDArg:STAod:LDArg+1:ST
Aod+1:LDAd:CMP&8FF:BNEntfl:
LDAd@0:STArf:.rnfl CMP@1:BNEnt
nfr:LDAd@80:STArf
860 .rnfr LDAd:BEQncs:LDAr
s:EDR&848:STArv:.ncs CLC:AD
Crf:STArg:STAnd:LDAd@9:STAnd+
1:LDXrx:LDYry:JSRcalc:LDAdad:
STArv:STAns:LDAdad+1:STArv+1:
STAns+1
870 LDx@3:LDY@24:JSRprint:
JSRcarckk:LDAns:STAos:LDAns+
1:STAos+1:LDAnd:STAod:LDAnd+
1:STAod+1:LDX@3:LDY@24:JMPpr
int
880 .carckk LDYry:STY&91:L
DA@3:STA&93:.otk1p LDAd@2:STA
&92:LDXrx:STX&90:.ink1p
890 LDx&90:LDY&91:JSRcheck
:CMP@8:BEQcart:INC@90:DEC@92
:BNEink1p:INC@91:DEC@93:BNEo
tk1p:RTS
900 .cart LDAd@7:LDX@carso
MOD256:LDY@carso DIV256:JSR&
FFF1:JSRinsc:JSRpscore

```

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```

910 INCcarrots:LDACarrots:
CMP#10:BNEntea:STAddead:ntea
920 LDAad:STAos:LDAad+1:ST
Aos+1:LDA#B20:STAod:LDA#B:A:S
TAod+1:LDX#1:LDY#16:JMPprint
930 .carso EQUW1:EQUW1:EQU
W100:EQUW5
940 .inisc SED:CLC:LDAscore
:CLC:ADC#1:STAos:LDAscore
+1:ADC#0:STAoscore+1:CLD:RTS
950 .pscore LDA#31:JSR&FFE
E:LDA#0:JSR&FFEE:LDA#2:JSR&F
FEE:LDA#17:JSR&FFEE:LDA#2:JS
R&FFEE:LDAoscore+1:JSRscbyt:L
DAoscore:JSRscbyt:LDA#48:JMP&
FFEE
960 .scbyt TAX:LSRA:LSRA:L
SRA:LSRA:JSRdig:TXA:AND#&F:
dig CLC:ADC#48:JMP&FFEE
970 .hmon1 EQU00:EQUW0:.vm
on1 EQU00:EQUW0
980 .hmon2 EQU00:EQUW0:.vm
on2 EQU00:EQUW0
990 .hmon3 EQU00:EQUW0:.vm
on3 EQU00:EQUW0
1000 .hmon4 EQU00:EQUW0:.vm
on4 EQU00:EQUW0
1010 .xy EQU00
1020 .hmonmv LDA#0:STAmxy:L
DX#hmon1 MOD256:LDY#hmon1 DI
V256:JSRmvhm:LDX#hmon2 MOD25
6:LDY#hmon2 DIV256:JSRmvhm:L
DX#hmon3 MOD256:LDY#hmon3 DI
V256:JSRmvhm:LDX#hmon4 MOD25
6:LDY#hmon4 DIV256:JMPmvhm
1120 .escp LDA#27:STAddead:L
DA#126:JMP&FFF4
1130 .main LDAspeed:STAtime
r:LDA#0:STAddead:STAcarrts:S
Tafall:.mainloop
1140 LDA#81:LDX#8F:LDY#8F
F:JSR&FFF4:TYA:BNEescp
1150 JSRmvrab:JSRhmomnv:JSR
vmonmv:JSRwait
1160 LDAddead:BEQmainloop:RT
S
1170 .wait BITtimer:BNImwait
:LDAspeed:STAtimer:LDA#19:JM
P&FFF4
1180 JNEXT:ENDPROC
1190 DEFPROCgraphics:RESTOR
E1280:FORNX=&90B0T0&A4FSTEP4:
READAS:INX=EVAL('B'+AS):NEXT
1200 VDU23,128,85,0,0,0,0,0
,0,0
1210 VDU23,129,85,170,0,0,0
,0,0,0
1220 VDU23,130,85,170,85,0,
0,0,0,0
1230 VDU23,131,85,170,85,17
0,0,0,0,0
1240 VDU23,132,85,170,85,17
0,85,0,0,0

```

```

V256:JSRmvhm:LDX#hmon4 MOD25
6:LDY#hmon4 DIV256:JMPmvhm
1030 .mvhm STX&9A:STY&9B:LD
Y#5:LDA(&9A),Y:BNEhmex:RTS:.
hmex LDY#0:LDA(&9A),Y:TAX:LD
Y#3:LDA(&9A),Y:TAY:JSRcalc:L
DAad:STAos:LDAad+1:STAos+1
1040 LDY#4:LDA(&9A),Y:LDYmx
y:CLC:ADC(&9A),Y:STA(&9A),Y:
LDY#1:CMP(&9A),Y:BEQcmd:INY
:CMP(&9A),Y:BNEcmd:INY
1050 .cmd LDY#4:LDA(&9A),Y
:CMP&FF:BEQcmd:LDA#&FF:STA
(&9A),Y:JMPcmd:.cmdr LDA#1
:STA(&9A),Y
1060 .dcmd LDY#0:LDA(&9A),
Y:TAX:LDY#3:LDA(&9A),Y:TAY:J
SRcalc:LDAad:STAns:LDAad+1:S
TAns+1:LDA#&30:STAod:STAnd:L
DA#&A:STAod+1:STAnd+1
1070 LDY#2:LDY#16:JMPpr
int
1080 .monchk LDY#3:LDA(&9A)
,Y:STA&91:LDA#2:STA&93:.otrl
p LDA#2:STA&92:LDY#0:LDA(&9A)
,Y:STA&90:.inrlp
1090 LDY#0:LDY#0:JSRcheck
:CMP#0:BNErabhr:INC&90:DEC&9
2:BNEinrlp:INC&91:DEC&93:BNE
otrlp:RTS
1100 .rabhr LDA#&FF:STAddead
:RTS

```

```

1110 .vmonmv LDA#3:STAmxy:L
DX#vmon1 MOD256:LDY#vmon1 DI
V256:JSRmvhm:LDX#vmon2 MOD25
6:LDY#vmon2 DIV256:JSRmvhm:L
DX#vmon3 MOD256:LDY#vmon3 DI
V256:JSRmvhm:LDX#vmon4 MOD25
6:LDY#vmon4 DIV256:JMPmvhm
1120 .escp LDA#27:STAddead:L
DA#126:JMP&FFF4
1130 .main LDAspeed:STAtime
r:LDA#0:STAddead:STAcarrts:S
Tafall:.mainloop
1140 LDA#81:LDX#8F:LDY#8F
F:JSR&FFF4:TYA:BNEescp
1150 JSRmvrab:JSRhmomnv:JSR
vmonmv:JSRwait
1160 LDAddead:BEQmainloop:RT
S
1170 .wait BITtimer:BNImwait
:LDAspeed:STAtimer:LDA#19:JM
P&FFF4
1180 JNEXT:ENDPROC
1190 DEFPROCgraphics:RESTOR
E1280:FORNX=&90B0T0&A4FSTEP4:
READAS:INX=EVAL('B'+AS):NEXT
1200 VDU23,128,85,0,0,0,0,0
,0,0
1210 VDU23,129,85,170,0,0,0
,0,0,0
1220 VDU23,130,85,170,85,0,
0,0,0,0
1230 VDU23,131,85,170,85,17
0,0,0,0,0
1240 VDU23,132,85,170,85,17
0,85,0,0,0

```

```

1250 VDU23,134,255,255,126,
126,60,24,0,0
1260 VDU23,135,255,129,195,
231,231,195,129,255
1270 ENDPROC
1280 DATA,1000000,0,70E1E1
70,96523010,8080482C,1110,10
10100,660F0F0,3C3C0F0F,0,808
0800,10101,10000000,FC3693C,
E0E06020,4C6E6E,0
1290 DATA,1000000,0,70E1E1
70,96523010,8080482C,1110,10
10100,660F0F0,3C1E0F0F,0,808
0800,10101,30101000,F0FE178,
30908090,4C6E6E,80808080
1300 DATA96A4C080,10102143,
0,E07878E0,0,8000000,0,10101
00,660F0F0,3C3C0F0F,8080,808
0800,236767,0,F3C69C3,707060
40,80808,80000000
1310 DATA96A4C080,10102143,
0,E07878E0,0,8000000,0,10101
00,660F0F0,C3870F0F,8080,808
0800,236767,10101010,F0F78E1
,C0901090,80808,C0808080
1320 DATA70780C08,3050,C880
0000,70F260C0,7073355,6F406F
0F,C0C8844,CE46CE0E,202C0C0F
,3070F20,8686060E,80C0E86

```

This listing is included in this month's cassette tape offer. See order form on Page 45.

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NO rest for the wicked this month, as we plough on into machine code at a rapid rate of knots. What with covering 16 new instructions and a brand new register, it's no surprise that by the end of the article we'll be going round in circles – or rather, loops.

The first of the instructions we'll meet is the increment operation. All this does is to tell the 6502 to increment – increase by one – the value held in a register or memory location.

INX increases the value in the X register, while INY increases the value held in the Y register.

To increment the value in a memory location, INC is the mnemonic, followed by the location's address. Strangely though, there isn't a command to directly increment the accumulator.

Program I shows our incrementing command in action. It's not spectacular, but it works and shows what it does so be satisfied for now.

You can experiment to your heart's desire later when you have seen some more useful applications in action. By now most of the program should need no explanation – which saves me a lot of trouble.

You should be able to see that the accumulator receives the value 65 – the Ascii value of A – which is then copied to the X register by way of the TAX we met last time. (Few things are

certain in assembly language programming except a dearth of memory and TAXs.)

Once we've got the value in the X register the program then goes on to INX, so that the 65 now has one added to it, making it 66. This is duly transferred from the X register back to the accumulator – TXA – and a call to oswrch has the letter B appearing on the screen.

As we originally put the Ascii code for A into the accumulator, this proves to those of little faith that INX actually has increased the value in the X register, though we have to move it back to the accumulator to see it printed.

Complementing the increment commands are three decrements. These are DEX, DEY and DEC which take one away from the value held in the X register, Y register and a specified memory location respectively.

Table I shows the mnemonics and their actions.

Try varying Program I so you get experience of using them all. Don't you agree it's infuriating that you can't simply increment the accumulator?

Taking a break from assembly language for a moment, have a look at Program II. Composed of pure, old-fashioned Basic, it's mainly just a FOR...NEXT loop which prints out a line of nine asterisks. While this may not be riveting stuff, consider for a moment how you'd do it in machine code.

Using what we know so far, you can't. But with the

Mnemonic	Effect
INX	Add one to X register
INY	Add one to Y register
INC &2100	Add one to value at address &2100
DEX	Subtract one from X register
DEY	Decrease Y register by one
DEC &75	Reduce value in location &75 by one

Table I: Increment and decrement instructions – one at a time

help of two new sets of commands and a smidgen of knowledge about yet another register, you'll find that you can create the

eight bits wide, just like our previous registers, but there the resemblance ends. So far we've been used to moving around all eight bits of a register at once with gay abandon, but with the status register this isn't possible.

In fact, the status register is really considered as a collection of individual bits – or flags – each being used to denote various things that are happening during the course of a program.

Their actual positions within the status register doesn't matter – we never

assembly language version of a FOR...NEXT loop and so increase the power of your machine code programs.

The new register is the status – or P – register. It's

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```
10 REM Program II
20 MODE 6
30 start=1
40 finish=9
50 FOR loop=start TO finish
60 PRINT "*";
70 NEXT loop
80 PRINT
```

assembly language version of a FOR...NEXT loop and so increase the power of your machine code programs.

The new register is the status – or P – register. It's

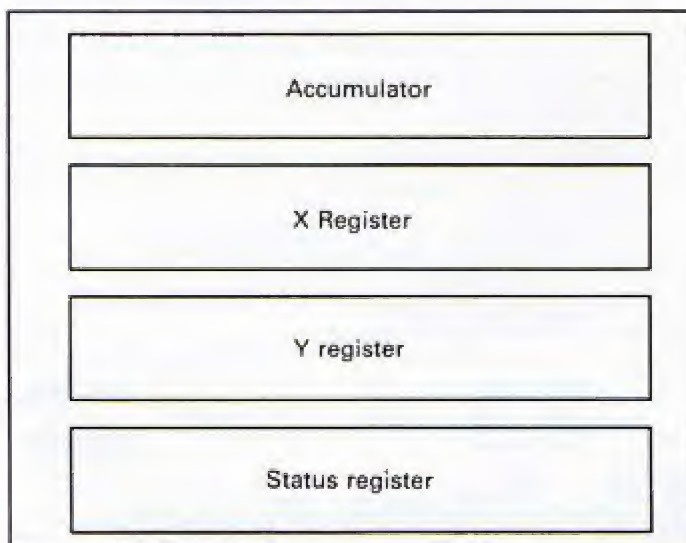


Figure 1: The 6502 registers so far

```
10 REM Program I
20 MODE 6
30 codeStart=&2000
40 oswrch=&FFEE
50 osnewl=&FFEF
60 P1=codeStart
70 [
80 LDA #ASC('A')
90 TAX / transfer 65 to X register
100 INX / increment the value in X
110 TXA / transfer contents of X to accumulator
120 JSR oswrch
130 JSR osnewl
140 RTS
150 ]
160 CALL codeStart
```


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need to know. Figure 1 shows our new schematic view of the 6502 while Figure II takes a closer look

flag. Let's take a look at each one in turn.

At its simplest, the negative - or N - flag is used to

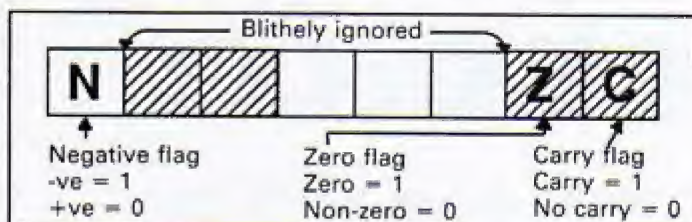


Figure II: The status register and three flags

at bits of the status register itself.

Having mentioned that the status register consists of eight separate bits which are used to flag various occurrences inside the micro, we'll now blithely ignore five of them and just concentrate on three.

As you might have guessed from Figure II, these are the negative flag, the zero flag and the carry

denote whether the result of the previous operation was a negative number. If it was, then this particular bit of the status register is set to one to indicate what's happened, otherwise it's cleared - or reset - to zero.

If you're into the intricacies of signed binary arithmetic then you might view this as the most significant bit of a result being copied into the N flag. If

you're not, don't worry. You'll soon see how easy it is to use.

As you might surmise from this, the zero - or Z - flag shows whether the last instruction resulted in a zero value. If it did, then the flag is set to one to show that this has happened. If it hasn't then it's cleared to zero.

If you think that's a little back-to-front, I agree, but that's the way it is. A zero result puts one in the zero flag, a non-zero result puts zero in it.

The final flag we'll be looking at is the carry - or C - flag. If this reminds you of doing your sums at school then you're on the right track.

Remember when you added two numbers in a column - say six and eight - and the answer came to 10 or more? You wrote down the smaller figure - in this case four - and carried the one over to the next column.

It's the same with machine code, except now we're adding bytes, and the carry operation comes in

Mnemonic	Flag	Condition
BNE	Z=0	Branch if Not Equal
BEQ	Z=1	Branch if Equal
BCC	C=0	Branch if Carry Clear
BCS	C=1	Branch if Carry Set
BPL	N=0	Branch if Plus
BMI	N=1	Branch if Minus

Table II: Branch commands and the flags that trigger them

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when there's a one left over from the most significant bit of the result. In this case the carry bit in the status register is set to show what's happened.

In effect, the carry bit acts as a ninth bit to a byte. We'll see how it's used in addition next month, but for the moment all you need to know is that the carry is set when the result of an addition is more than 255 – the maximum value a single byte can hold.

So, we're concentrating on three bits of the status register, and the state of the various bits depends on

the address supplied with the command.

If the condition isn't met then the command is ignored and the program moves on to the next instruction.

So by using the branches we can get the program to perform jumps, depending on the current condition of the status flags. But how do we actually effect these flags? To do this, we'll have to learn about another group of commands: Comparison instructions.

These are CMP, CPX and CPY and what they do is to compare a specified value

result – which isn't used – is neither negative or zero.

The second case is when the two values are equal. In

the program moves on to the BNE – Branch if Not Equal – instruction.

If the two values aren't equal, then the zero flag is zero and the branch is taken back to *loop*. Only when they are equal does the program drop out of the loop. The result is an assembly language equivalent of a FOR...NEXT loop.

Mnemonic	Effect
CMP #65	Compare value in accumulator with 65
CPX store	Compare X with value in location labelled <i>store</i>
CPY #finish	Compare Y value with value of <i>finish</i>

Table III: Comparisons compared

what's happening in the current program. So far, so good. But what has this got to do with reproducing Program II in assembly language?

The answer is everything, because by keeping track of the status bits we can make our assembly programs branch to a different part of the program, according to which particular flags in the status register are set or clear.

The 6502 allows us to jump in a similar manner to Basic's notorious GOTO command. We can go forward or backwards, jumping over whole sections of code or creating loops.

Such instructions are known as branch commands, and Table II shows six of them and the conditions needed for that branch to be taken.

If the condition is met – a flag has a particular value – then the program jumps to

with the value in the accumulator or X or Y register.

Notice the word compare – nothing happens to either value, they're just looked at and left untouched. Only the flags in the status register are altered, according to the result of the most recent comparison. Table III shows all of the available comparison commands.

What happens is that – for reasons we'll ignore for the moment – the carry flag is set and then the value specified in the comparison command is subtracted from the register specified.

Now there are three things that can happen, and in each case the result on the status flags is different.

In the first case the number in the register is larger than the value specified. This results in the carry flag being left set while the zero and negative flags are cleared as the

this case the carry flag still remains set, the negative flag is cleared but the zero flag is set to one to show that the result is zero.

In the final case, where the value in the register is less than that being taken away, the carry flag is reset to zero (it's been "borrowed" for the take-away), the zero flag is cleared and the negative flag is set.

Table IV sums up the effects of the different cases on the status flags.

And now, with all that theory behind us, you should be able to understand what's happening in Program III, our assembly language version of Program II.

Here, an initial value is stored in the X register and every time round the loop it is incremented by one. As soon as this happens the value in the X register is compared with *finish* and

Value difference	N	Z	C
Register greater	0	0	1
Register equal	0	1	1
Register less	1	0	0

Table IV: Different conditions, different flags

```
10 REM Program III
20 MODE 6
30 codeStart=&2000
40 oswrch=&FFEE
50 osnewl=&FFE7
60 start=0
70 finish=9
80 asteriskCode=42
90 PX=codeStart
100 [
110 LDA # asteriskCode
120 LDX #start
130 .loop
140 JSR oswrch
150 INX
160 CPX #finish
170 BNE loop
180 JSR osnewl
190 RTS
200 ]
210 CALL codeStart
```

```
10 REM Program V
20 MODE 6
30 codeStart=&2000
40 oswrch=&FFEE
50 osnewl=&FFE7
60 first=5
70 second=10
80 asteriskCode=42
90 PX=codeStart
100 [
110 LDA # asteriskCode
120 LDX # first
130 .loop
140 JSR oswrch
150 INX
160 CPX # second
170 BCC loop \ first is less than second
180 BEQ loop \ first is equal to second
190 NOP / when this point is reached
200 NOP / first must be greater than second
210 JSR osnewl
220 RTS
230 ]
240 CALL codeStart
```

And that's all we're going to cover for this time. Program IV continues my obsession with asterisks. It's in Basic again but this time I've used a FOR...NEXT loop.

Program V shows an assembly language version which I'll leave for you to figure out – though I will tell you that NOP stands for No Operation and does nothing!

● Once you've understood the code, try writing your own loops to create REPEAT...UNTIL loops with different operators, such as <= or <>, in the final condition. That's an intellectual challenge which should keep you occupied until next month, when we'll be looking at some simple sums and three new addressing modes.

```
10 REM Program IV
20 MODE 6
30 first=5
40 second=10
50 REPEAT
60 PRINT '*';
70 first=first+1
80 UNTIL first>second
90 PRINT
```


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17. *TYPE – displays a file on screen with no line numbers.
18. *DUMP – to view a file's contents on screen.
19. *LANG – selects a default language to be booted on <CTRL-BREAK>
20. *HELP – provides a full 'help' list on all the ROM's commands
21. *AQRPAGE – selects the specified page in any AQR present.

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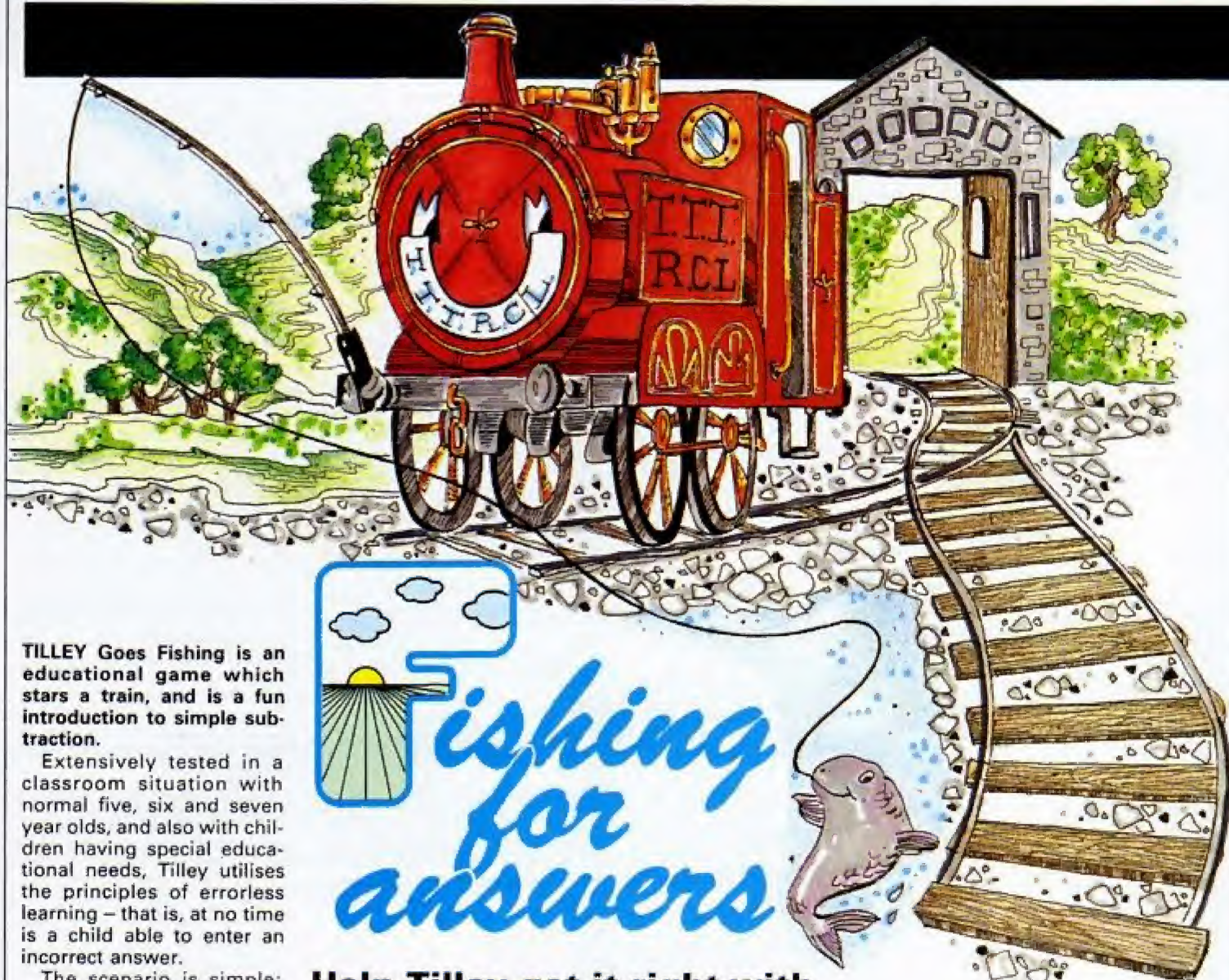
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Extensively tested in a classroom situation with normal five, six and seven year olds, and also with children having special educational needs, Tilley utilises the principles of errorless learning – that is, at no time is a child able to enter an incorrect answer.

The scenario is simple: Tilley has gone to catch some fish from the top of her favourite bridge, but she needs some help with working out just how many are left in the water.

The child – or children – must follow a simple subtraction process through to its correct conclusion, by making use of both the numeric and graphical display of the sum in progress.

First, the main screen is drawn, with Tilley sitting atop a red bridge. Then a random number of fish appear in the river beneath, with a flashing question mark beside them.

This is a prompt to enter the correct number of fish, and at this point it should be noted that all keyboard input is numeric and does not require the use of the Return key.

When the child has entered the right number – for 10, the 1 and 0 keys are pressed – that number will

appear at the top of the screen, forming the first part of the sum.

Now Tilley will begin to fish, dropping her line into the water one or more times. As each fish is caught, it disappears from the water to be placed in a growing line on the bridge beside Tilley. Therefore the subtraction can be seen in real action, allowing for a much better grasp of what is happening.

When Tilley has finished, another flashing question mark will appear, this time expecting for an answer the number of fish that were caught.

When the right answer has been entered, it will appear at the top of the screen after the first



Fishing for answers

Help Tilley get it right with this educational maths game from RON HAGLEY

PROCEDURES

title	Draws the title screen
Tilley	Prints Tilley
dataload	Defines the characters
pause	Delay loop

number. The two are separated by a minus sign, and an equals sign follows the second number.

Now the sum has been displayed, a third question mark will appear, prompting for the answer to the whole sum. This can be worked out either numerically, by examining the written sum, or by counting the number of fish left in the water.

There is a reward for getting each sum right, in the form of the rather apt

nursery rhyme tune: "One, two, three four five, once I caught a fish alive ...". The sum – and all the fish – will then disappear, and the water will be re-populated ready for the next sum.

The game is fully error-trapped, never generating zero or a negative number of fish, and to avoid needless frustration arising from accidental pressing of the Break key it can only be halted by pressing Control+Break.


```

10 REM TILLEY
20 REM By R.F. Hagley
30 REM (c) Electron User
40 REM
50 MODE 2
60 VDU23;8202;0;0;0;
70 PROCdataload
80 PROCtitle
90 CLG
100 Y=750
110 X=500
120 PROCTilley(X,Y)
130 PROCpicture
140 END
150 DEFPROCdataload
160 VDU23,224,24,24,24,127
,127,127,127,127
170 VDU23,225,127,127,127,
127,127,127,127,126
180 VDU23,226,60,56,0,0,0,
3,3,0
190 VDU23,227,0,0,0,0,0,0,
0,1
200 VDU23,228,3,7,0,0,15,1
2,12,15
210 VDU23,229,0,0,63,255,1
92,0,0,0
220 VDU23,230,0,6,6,255,25
5,255,255,255
230 VDU23,231,255,254,254,
255,255,255,31,158
240 VDU23,232,192,255,0,0,
195,195,195,195
250 VDU23,233,129,0,0,0,0,
0,0,0
260 VDU23,234,7,0,0,0,0,0,
0,0
270 VDU23,235,0,1,1,0,0,0,
0,1
280 VDU23,236,0,0,255,255,
0,0,0
290 VDU23,237,0,0,0,0,0,0,
224,96
300 VDU23,238,32,0,0,0,0,0,
0,0
310 VDU23,239,0,0,15,250,2
50,250,255,255
320 VDU23,240,127,127,127,
127,127,127,127,63
330 VDU23,241,255,255,0,0,
240,48,48,240
340 VDU23,242,224,0,0,0,0,
0,0,0
350 VDU23,243,15,15,0,5,5,
5,0,0
360 VDU23,244,128,128,128,
128,128,128,128,192
370 VDU23,245,0,0,240,16,1
6,16,63,63
380 VDU23,246,63,63,63,63,
63,63,63,63
390 VDU23,247,63,63,0,0,25
2,204,204,252
400 VDU23,248,120,0,0,0,0,
0,0,0
410 VDU23,249,240,240,0,22
4,239,239,192,192
420 VDU23,250,192,192,192,
192,192,192,192
430 VDU23,251,192,192,0,0,
0,48,48,0
440 VDU23,252,0,255,0,0,0,
0,0,0
450 VDU23,253,0,0,0,0,0,19

```

```

2,192,0
460 VDU23,254,0,57,125,154
,154,125,57,0
470 VDU23,255,255,255,255,
255,255,255,255
480 VDU5
490 GCOL 0,130
500 CLG
510 ENDPROC
520 DEFPROCthomas(X,Y)
530 GCOL0,0
540 MOVE X,Y
550 PRINT CHR$224;CHR$32;C
HR$243;CHR$249
560 MOVE X,Y-30
570 PRINT CHR$225;CHR$237;
CHR$32;CHR$250
580 MOVE X,Y-60
590 PRINT CHR$226;CHR$238;
CHR$253;CHR$251
600 GCOL0,4
610 MOVE X,Y
620 PRINT CHR$32;CHR$230;C
HR$239;CHR$245
630 MOVE X,Y-30
640 PRINT CHR$227;CHR$231;
CHR$240;CHR$246
650 MOVE X,Y-60
660 PRINT CHR$228;CHR$232;
CHR$241;CHR$247
670 MOVE X,Y-90
680 PRINT CHR$234;CHR$233;
CHR$242;CHR$248
690 GCOL0,1
700 MOVE X,Y-60
710 PRINT CHR$229;CHR$236;
CHR$236;CHR$236

```

This is one of hundreds of programs available FREE for downloading on

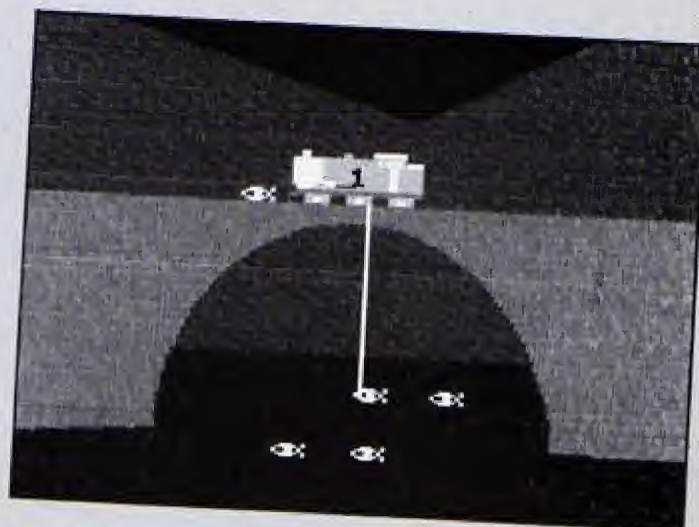
MicroLink

In addition to these many BBC Micro programs in the MicroLink library will also run on the Electron.

```

720 GCOL0,3
730 MOVE X,Y-30
740 PRINT CHR$32;CHR$235;C
HR$244
750 ENDPROC
760 DEFPROCpicture
770 GCOL0,1
780 VDU29,640;250;
790 X=380;Y=0;MOVE X,Y
800 FOR I=1 TO 31
810 Y=Y+X/10;X=X-Y/10
820 DRAW X,Y
830 NEXT
840 DRAW -640,0
850 FOR N=0 TO 410 STEP 3
860 PLOT 77,-640,N
870 NEXT
880 MOVE 380,0
890 DRAW 630,0
900 FOR N=0 TO 390 STEP 3
910 PLOT 77,630,N
920 NEXT
930 MOVE 0,-100
940 GCOL0,6
950 FOR N=-350 TO 150 STEP
3
960 PLOT 77,0,N

```



```

970 NEXT
980 GCOL0,7
990 MOVE -640,650
1000 FOR N=550 TO 1000 STEP
3
1010 PLOT 77,0,N
1020 NEXT
1030 GCOL0,2
1040 MOVE 100,550;DRAW -640
,750;PLOT 85,-640,550
1050 MOVE 100,550;DRAW 640,
810;PLOT 85,640,550
1060 PROCfish
1070 ENDPROC
1080 DEFPROCfish
1090 VDU19,15,0,0,0,0
1100 C=RD(10)
1110 IF C<2 THEN 1100
1120 D=RD(9)
1130 IF D>=C THEN 1120
1140 E=C
1150 IF C=10 E=9
1160 AX=-150;BX=100
1170 FOR N=1 TO E
1180 IF AX=300 BX=BX-100
1190 IF AX=300 AX=-150
1200 GCOL0,0
1210 MOVE AX,BX;PRINT CHR$2
54
1220 AX=AX+150
1230 NEXT
1240 IF C<10 GOTO 1260
1250 MOVE 0,-200;PRINT CHR$
254
1260 GCOL0,8
1270 MOVE 330,0;PRINT CHR$6
3
1280 *FX15,1
1290 QX=INKEY(100)
1300 QX=QX-48
1310 IF QX=0 QX=10
1320 IF QX=C GOTO 1340
1330 GOTO 1290
1340 VDU7
1350 MOVE 330,0
1360 GCOL0,6
1370 PRINT CHR$255
1380 NOX=QX+48
1390 IF NOX=58 THEN 1420
1400 GCOL 0,0;MOVE 330,0;PR
INT CHR$NOX
1410 GOTO 1430
1420 GCOL0,0;MOVE 330,0;PRI

```

```

NT CHR$49;CHR$48
1430 PROCpause(150)
1440 GCOL0,6;MOVE330,0;PRIN
T CHR$255;CHR$255
1450 IF NOX=58 THEN 1490
1460 GCOL0,15;MOVE -270,730
1470 PRINT CHR$NOX
1480 GOTO1510
1490 GCOL0,15;MOVE -330,730
1500 PRINT CHR$49;CHR$48
1510 MOVE -200,730;PRINT CH
R$45
1520 PROCpause(150)
1530 EX=-150;FX=100;HX=-230
;IX=435
1540 FOR N=1 TO 0
1550 GCOL0,0
1560 IF EX=300 FX=FX-100
1570 IF EX=300 EX=-150
1580 MOVE EX+10,410;DRAW EX
+10,FX-20
1590 GCOL0,6;MOVE EX,FX
1600 PROCpause(200)
1610 PRINTCHR$255
1620 MOVEEX+10,FX-20
1630 DRAW EX+10,150
1640 GX=350
1650 IF EX=0 GX=380
1660 IF EX>10 GX=340
1670 GCOL0,2;DRAW EX+10,GX
1680 GCOL0,1;DRAW EX+10,410
1690 EX=EX+150
1700 GCOL 0,0
1710 MOVE HX,IX;PRINT CHR$2
54
1720 HX=HX-100
1730 IF HX<-700 IX=IX+50
1740 IF HX<-700 HX=-230
1750 PROCpause(100)
1760 NEXT
1770 *FX15,1
1780 MOVE-400,540;GCOL0,8;P
RINT CHR$63
1790 LETQX=INKEY(100)
1800 QX=QX-48
1810 IF QX=0 THEN 1830
1820 GOTO 1790
1830 VDU7
1840 GCOL 0,2;MOVE-400,540;
PRINT CHR$255
1850 GCOL0,0;MOVE-400,540;P

```

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Game

```

RINT CHR$(Q%+48)
1860 PROCpause(150)
1870 GCOL0,2:MOVE-400,540:P
RINT CHR$255
1880 GCOL0,15:MOVE -110,730
:PRINT CHR$(Q%+48)
1890 MOVE0,730:PRINT CHR$61

```

```

1900 MOVE 90,730:GCOL0,8:PR
INT CHR$63
1910 Q%=INKEY(100)
1920 Q%=Q%-48
1930 IF Q%<0 THEN 1950
1940 GOTO 1910
1950 GCOL0,7:MOVE 90,730:PR
INT CHR$255
1960 GCOL0,15: MOVE 90,730:
PRINT CHR$(Q%+48)
1970 VDU19,15,15,0,0,0
1980 FOR n=1 TO 2
1990 RESTORE
2000 FORN=1 TO 24
2010 READ PITCH,DUR
2020 SOUND 1,-15,PITCH,DUR
2030 TX=TIME:REPEAT UNTIL T
IME>TX+5:DUR
2040 NEXT
2050 NEXT
2060 DATA88,8,88,8,80,4,72,
4,72,8,88,4,88,4,92,4,100,4,
100,4,92,4,92,8,92,8,88,
4,80,4,80,8,72,4,68,4,60,4,

```



```

68,4,80,4,72,4,72,8
2070 FOR N=100 TO -200 STEP
-100
2080 MOVE -150,N:GCOL0,6
2090 PRINT CHR$255;CHR$255;
CHR$255;CHR$255;CHR$255;CHR$
255;CHR$255
2100 NEXT
2110 FOR N=435 TO 485 STEP
50

```

```

2120 GCOL0,2:MOVE-730,N
2130 PRINT CHR$255;CHR$255;
CHR$255;CHR$255;CHR$255;CHR$
255;CHR$255;CHR$255;CHR$255
2140 NEXTN
2150 GCOL0,7:MOVE-330,730
2160 PRINT CHR$255;CHR$255;
CHR$255;CHR$255;CHR$255;CHR$
255;CHR$255;CHR$255;CHR$255
2170 GOTO 1090

```

```

2180 ENDPROC
2190 DEFPROCpause(TX)
2200 TIME=0
2210 REPEAT
2220 UNTIL TIME=TX
2230 ENDPROC
2240 DEFPROCtitle
2250 PROCthomas(50,900)
2260 PROCthomas(50,200)
2270 PROCthomas(950,200)
2280 PROCthomas(950,900)
2290 GCOL0,4
2300 PROCshadow("Tilley",41
0,700)
2310 PROCshadow("goes fishi
ng",200,500)
2320 PROCpause(400)
2330 ENDPROC
2340 DEFPROCshadow(AS,x,y)
2350 VDU5
2360 GCOL0,3:MOVE x-8,y-8:P
RINT AS
2370 GCOL0,4:MOVE x,y:PRINT
AS
2380 ENDPROC

```

This listing is included in this month's cassette tape offer. See order form on Page 45.

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Electron Memory Map

Part 3

This month we examine page three of the Electron's memory, which is split into three parts: The VDU variables, the cassette/rom filing system workspace and the keyboard buffer.

The VDU variable workspace is probably of most interest.


It holds all the information about the current screen mode, and a bright pro-

grammer can make clever use of this area.

For instance Robin Nixon's Custom Character series – which started in February 1988 – fooled the computer into printing 40 characters across the screen in Mode 2 by poking illegal information into all sorts of page three locations.

TABLE 1 – The VDU Variables

TABLE 1 - The VDU Variables			
Address		Use	
&300/&301 &302/&303 &304/&305		Graphics window left column in pixels. Graphics window bottom row in pixels. Graphics window right column in pixels.	
&306/&307 &308 &309 &30A &30B &30C-&30F		Graphics window top row in pixels. Text window left hand column. Text window bottom row. Text window right hand column. Text window top row. Current graphics origin in external coordinates.	
&310-&313		Current graphics cursor in external coordinates.	
&314-&317		Old graphics cursor in external coordinates.	
&318 &319 &31A		Current text cursor X coordinate. Current text cursor Y coordinate. Line within current graphics cell containing the current graphics point.	
&31B-&31E		Either graphics workspace or first part of VDU queue.	
&31F-&323 &324-&327		The VDU queue. Current graphics cursor in internal coordinates.	
&328-&349 &34A/&34B &34C/&34D &34E &34F		Graphics coordinate workspace. Text cursor position. Text window width in bytes. High byte of bottom of screen memory. Character size in bytes for the current mode.	
&350/&351 &352/&353 &354 &355 &356		Address of screen top left corner. Number of bytes per character row. High byte of screen memory size. Current screen mode. Screen display type: 0 = 20k mode. 1 = 16k mode. 2 = 10k mode. 3 = 8k mode.	
&357 &358 &359 &35A &35B		Current text foreground colour. Current text background colour. Current graphics foreground colour. Current graphics background colour.	
&35C		Current foreground graphics PLOT mode as set by GCOL. Current background graphics PLOT mode as set by GCOL.	
&35D/&35E &35F &360		VDU jump vector. Old setting of cursor start register. Number of logical colours in the current mode minus one.	
Address		Use	
&361		Number of pixels per byte minus one for the current mode, or zero if text only mode.	
&362		Left hand colour mask.	
&363		Right hand colour mask.	
&364		X coordinate of text input cursor.	
&365		Y coordinate of text input cursor.	
&366		Normally 127.	
&367		Font flag. If a bit is set, the corresponding section of the character set is held in ram. Bit 7 for chars 32-63. Bit 6 for chars 64-95. Bit 5 for chars 96-127. Bit 4 for chars 128-159. Bit 3 for chars 160-191. Bit 2 for chars 192-223. Bit 1 for chars 224-255.	
&368-&36E		Font location bytes. Each entry in this block contains the high address byte of the corresponding zone block (see &367).	
&36F-&37E		The current palette. These bytes contain the currently defined logical colours, in descending order.	



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Turn to Page 40 ►



TABLE 2 –
The CFS/RFS variables

Address	Use
&380-&39C &39D	BPUT file header block. BPUT buffer offset for next byte in cassette buffer.
&39E	BGET buffer offset for next byte in cassette buffer.
&39F-&3A6 &3A7-&3B1 &3B2-&3BD &3BE-&3C1 &3C2-&3C5 &3C6/&367 &368-&3C9 &3CA	Unused in OS 1.2. BGET filename. Filename terminated by zero. Load address of file. Execution address of file. 16 bit current block number. Block length. Block flag type. Indicates whether a file is locked.
&3CB-&3CE &3CF/&3D0 &3D1	RFS EOF+1. 16 bit checksum. Sequential block gap as set by *OPT 3,n.
&3D2-&3DC &3DD/&3DE &3DF &3E0-&3FF	Filename of file being searched for, terminated by zero. Number of next expected BGET block. Copy of last block flag read. Keyboard input buffer.

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- Hac-Man, *The Micro User*, March 1988



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TO ORDER PLEASE USE THE FORM ON PAGE 45

MICRO MESSAGES

Why there's a Plus too few

I HAVE heard of a Plus 1, 3 and 4 for the Electron, but not a Plus 2. Could you tell me if there is such a product? If there is, what is it used for, and if not, why not?

On another note, could you help me in finding a screen dump routine for use with commercial software, that works like your Snapshot utility published in the September 1987 issue of Electron User?

But instead of dumping the screen to disc, is there one which will print it out directly? Perhaps it is possible to alter Snapshot to achieve this. My setup is an Electron, Plus 1 and an Epson FX-80 printer. — R. P. De la Haye, Emsworth, Hants.

● Acorn originally intended the Plus 2 to be an Econet system. It produced a proto-

type, but it never got into full scale production. However, there is such a product as the Plus 2, but not in the sense that you are probably imagining. The new Advanced Plus 2 rom from Pres is a replacement for the Plus 1 rom.

It offers a complete new set of star commands, as well as removing some of the old Plus 1 bugs. The AP2 is reviewed in detail on Page 47 of this issue.

We're afraid that it is not feasible to alter Snapshot to dump directly to the printer.

A full screen dump would need to be incorporated into the listing, which as it stands does nothing more

than wait for the Control key to be pressed, then save the screen to disc. You could then dump it to the printer using a separate utility.

Tape

translation

BEING a discerning Electron user, always eager to type in a promising program, I recently saw the translator program by Pierre Dupont. This promised to be an invaluable aid to my French lessons at school.

I typed it in and checked it

through, then wondered why it would not work. I read through the instructions and saw to my horror that the program was for disc users only.

As this program would no doubt be of great use to other tape users as well, I was wondering if you could print a version for cassette based systems. Even a small upgrade for the existing program would be great. — Stephen Andreassen, Urmston, Manchester.

● Pierre has very kindly given us the following upgrade which allows tape users to use the translator.

Replace line 300 with:

```
300 DEFPROCload:PROCtitle('
LOAD dictionary'):INPUT""
Filename ".dic$
```

and delete line 330.

Frak!

instructions

I HAVE enclosed my copy of the Frak! instructions for P. Sanderson (Micro Messages, June 1988). I had the original version of Frak!, with the screen designer instructions included.

I also have a request to make. Can anyone come up with a poke for Superior's Citadel? Preferably for infinite energy, as I am having a hard time of it. — J. Fish, Chelmsford, Essex.

● Unfortunately, we can't reproduce the actual cassette inlay, as it would be an infringement of copyright. However, here's the

Back the drive for discs

HAS anybody noticed a slight difference in the last three releases from Superior Software? Here's a clue — take a look at its advertisements where you are given the prices and formats. There's something missing ...

OK, if you haven't already found it, I'll tell you. For some reason, Superior is not producing discs for the Electron any more — probably because not many people bought them the first time around.

We were all moaning that there weren't any discs available, and when they began to appear, we didn't buy them. They're only a couple of pounds more, and

for that you get increased reliability, not to mention almost instant loading.

I suggest that those of you who feel as I do, that this has been a missed opportunity, should write to the software houses again — and this time, if we're lucky and more discs become available, for goodness sakes buy them!

While I'm on the subject, it may be a good moment to point out that many people are awaiting an occasion such as this to start saving for a disc drive. So even if you don't have one yet, write a letter anyway. — J. Brasier, Strelley, Nottingham.

● Superior Software has

issued the following statement to us which it hopes will clear up its policy concerning Electron discs:

"It is not normally viable to produce single games on Electron discs, because of the large number of possible formats and the relatively low sales generated.

"It is mainly compilations which will now appear on disc for the Electron, but for various commercial reasons Play it again Sam 2 will be available only on cassette for the Electron".

We can see their point, but if enough disc drive users write to Superior and other software houses, we may yet convince them otherwise.

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gist of it:

- Escape+Return enters the designer.
- Q and W cycle through the various shapes available.
- Z, X, / and : move the current shape around the screen.
- I fixes the screen in memory.
- Control+C clears the screen.
- Control+S saves the current set of screens to tape.
- Control+L loads a previously saved set of screens.
- Escape returns you to the Frak! demo – but remember to press I to record the current screen.

You won't be allowed to record a screen if there isn't at least one key, and Trogg, on the screen.

Trogg can only be placed on or removed from the screen when the left-hand edge of the playing area is visible. Don't put too many platforms near the top of the screen – the game becomes too difficult to play.

Don't worry about trying to fill the whole playing area if you don't want to. If when trying to record a screen, you get a *No Room* error, either scrap it or trim it down a bit.

How screens are stored

CONCERNING the March 1988 issue of *Electron User*, in your arcade game programming series the writer explains where the screen is stored in memory, but fails to say exactly how it is stored.

I have tried in vain to plot a colour to the screen and read the memory location used. Please put me out of my misery.

Also I think it would be an idea to run two major series: One about Basic programming which follows on from the techniques explained in the *User Guide*, and another along the same

ALL programs printed in this issue are exact reproduction of listings taken from running programs which have been thoroughly tested.

However on the very rare occasions that mistakes may occur corrections will be published as a matter of urgency. Should you encounter error messages when you type in a program

they will almost certainly be the result of your own typing mistakes.

Unfortunately we can no longer answer personal programming queries concerning these mistakes. Of course letters about suggested errors will be investigated without delay, but any replies found necessary will only appear in the mail pages.

lines, but teaching assembly language programming. Included in the two series could be relevant applications for the new skills learnt.

● The screen memory is stored in encoded form, so it is quite difficult to extract a pixel from within a byte unless you know the coding used.

In Mode 5 four pixels are encoded in every byte, and the bits which go to make up the pixels are interlaced within the byte.

Bits seven and three make up the first pixel, six and two are the second, five and one the third and four and zero the fourth.

Only two bits are used per pixel because the colours range from zero to three, and this can be stored in two bits using binary notation.

We have run series on Basic programming in the past, catering for beginners through to explaining more advanced techniques. And Pete Bibby's current series on assembly language is aimed directly at the newcomer to 6502 machine code.

Starship

grounded

I WISH to point out an error in February's *Arcade Corner*. The poke given for *Starship Command* was incorrect.

The program as shown

will generate the error message No such variable at line 30. So to correct the listing, place line 50 at line 15, and delete line 50. Thanks for an excellent magazine. – **Mathew Gullick (11), Pudsey, West Yorkshire.**

Printer

Driver

I AM a subscriber to your good magazine, and until now I have never had any complaints. I have just bought myself a printer and invested in the word processor *View*.

My typeface is pretty flat and unimpressive, so diving into my archives of *Electron User* I came up with the *Printer Driver II* from the August 1987 issue.

However, I have a cassette based system and my version of *View* seems to dislike the command *LOAD* when used without discs. It says Not with cassette, so I have to use *READ* instead.

But *READ* seems to read the driver straight in as text, and all I get is a load of mumbo-jumbo on the text editing screen.

I hope you can tell me how to get this utility to work on my small but useful system, and look forward in anticipation to a reply. – **David Styles, Enfield, Middlesex.**

● We've had quite a few letters along this line, from

people who couldn't get the assembled driver to load properly. The correct method – which strangely enough isn't mentioned in the *Electron View* manual, but is in the BBC Micro version – is to type:

```
PRINTER filename
```

where *filename* is the name of the desired driver – in this case *DRIVER*.

Editor error

IN the March 1986 issue of *Electron User*, there is a disc editor utility by Roland Waddilove. At the time, I typed in the program but didn't actually get to use it seriously.

This week, while trying to organise my discs, I came across it again and decided to put it to the test, in the process discovering a fault in the listing.

In the list of control keys, Shift+Cursor up/down are used to display the first or second 128 bytes of a sector. Line 90 reads:

```
90 IF key$="" 0%=@:PROCdi
   splay
```

But Shift+Cursor up is a £ sign. So line 90 should read:

```
90 IF key$="£" 0%=@:PROCdi
   splay
```

Thank you anyway for a really useful utility which I look forward to using in earnest in the future. – **R. A. Brookes, Barnehurst, Kent.**

● In those days we used an older method of typesetting listings, and the £ sign was reproduced – as it is on most ordinary printers – as an apostrophe.

Tiny treats

I HAVE recently bought an Acorn Electron, and as I don't like typing in long programs I'd like to take some of your valuable *Micro Messages* space to thank you for 10 Liners.

I like these as they are

short and very good. — Adam Galpin, Chard, Somerset.

● It's the contributors who we in turn must thank, for producing what seems to be a very popular page.

And by the way, our special thanks to David Sharpe for tantalising some of you with his April fool joke in May's 10 Liner page. Colour on a black and white monitor, indeed!

Interface

for a mouse

I WOULD like to thank you for such an interesting and informative magazine, and ask you for some advice on how I can upgrade my computer with a mouse and CAD package.

I also believe I would need an interface. I have an Electron with a Plus 1, and a Panasonic KX-P1080, which is a marvellous printer.

And is there any way I can stop View outputting seven to eight blank lines at the top of the page when I print?

Also, I'm thinking about writing one or two programs — could you tell me the average royalties paid? — Kevin Sutherland (13), Lock-
erbie, Dumfriesshire.

● You certainly do need an interface to drive a mouse. If you can get the cash, you might find Slogger's Bicasso package worth a try. It includes user port, mouse and Nidd Valley's Illustrator software for £75.

View will by default reserve eight blank lines at the top and bottom of a page. These are in fact settable margins and are defined as follows:

The top four blank lines are known as the top margin, and the next four as the header margin. The bottom eight lines are likewise split into a footer margin and a bottom margin.

If you are not using headers and footers, as shown in the View manual, then you can set these all to zero with the following

ALAS, there was a misprint in my letter from the May 1988 issue of Electron User. The text in the third box should read:

```
?&FE07=?&282
```

and not as it appeared.

After reading Andrew Bury's letter in the February edition about speeding up the Electron, I decided to investigate the feasibility of disabling interrupts while in Basic.

This is perfectly possible, although there are certain drawbacks: Disabling interrupts cannot be done directly from Basic, so add the following line to any program you wish to speed up:

```
PX=&90:[.on CL:RTS:  
.off SE:RTS:]
```

Then to speed up the program at any point, use:

```
CALL on
```

embedded commands right at the top of text:

```
TM 0  
HM 0  
FM 0  
BM 0
```

As far as royalties go, they vary considerably from company to company. But rest assured — if you write a best-seller, you'll be rich!

Helpful

service

I WOULD like to express my gratitude to Mr. John Wyke of Jafa Systems.

Having experienced a couple of problems with the construction of the Electron Mode 7 adapter kit, I contacted Mr. Wyke for technical

and to put things back to normal:

```
CALL off
```

The disadvantages of disabling interrupts are that the TIME function will no longer work.

In addition, flashing colours won't flash, using the cassette and printer will be dodgy and the keyboard will not be scanned.

However, keys can still be read directly using Basic's negative INKEY command. And the operating system does seem to re-enable interrupts for the duration of certain vital tasks like printing or cassette access — but don't bank on it.

The sort of programs which will benefit the most from these techniques are those which involve a lot of number-crunching in a high resolution mode.

A typical example would be Geoff Stanton's Loggers 10 Liner from the March

1987 issue of Electron User, which runs in Mode 1.

On average, my programs seem to run up to 30 per cent faster with interrupts disabled. The machine theoretically might crash, but it hasn't happened to me — yet!

On another note, what does *FX178 do? According to the Advanced User Guide this call is undefined, but it has appeared in a number of Electron User programs. — Phil Bender, Sunderland.

● The *FX 178 command turns the keyboard off, until a *FX 178,255 is encountered.

This speeds things up further, but as it completely disables the keyboard event, you can thereafter only read keys from within machine code by paging in roms seven or eight.

This particular technique was detailed by Michael Jacobsen in the August 1986 issue of Electron User.

advice which was freely given with courtesy and professionalism.

The result is that the fault has been traced to my monitor. Seldom have I found such helpful service, and it has been a pleasure to deal with Mr. and Mrs. Wyke.

I would unreservedly recommend their products to your readers, as not only are they excellent value for money — especially as some products are available in kit form, which appears to be rare in the computer hardware field — but their attitude is an object lesson in customer relations.

Thank you Jafa for supporting the Electron. You are a rare luxury to those of us who enjoy electronics as well as computing.

This letter was written using the BBC Micro version of Wordwise Plus, thanks to

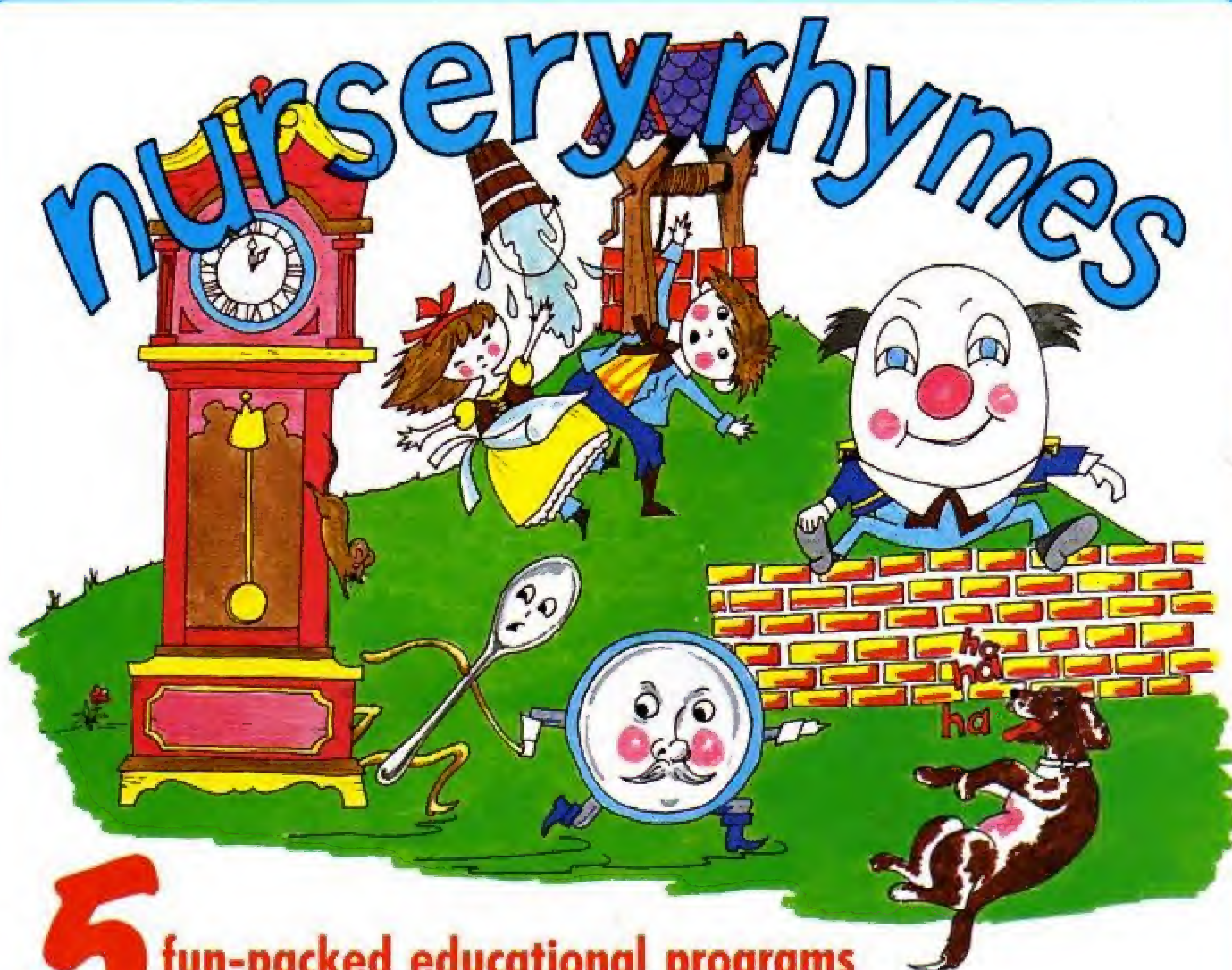
the Jafa Mode 7 adapter. — Mr. F. G. Fletcher, Shiregreen, Sheffield.

Search for

Pascal

HELPI I am trying to locate a piece of software on cassette called S-Pascal. This used to be available from Acornsoft for the Electron. I made enquiries to Acorn to find out from where it could be obtained, but received no useful answer.

So if any reader, or someone in the trade, knows where I can find this cassette, please let me know. — D.M. Mayes, 66 Shaw Road, Boston, Lincs PE21 8NN.



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EASY reader is a simple style analyser, based on current studies of linguistics. It reads each sentence of a text file and gives you an idea of how readable they are.

The program scores the sentences on a readability scale from 1 – incredibly hard – to 100 – very easy – and gives you feedback on stylistic features such as sentence length, clause structure, and the amount of technical jargon found.

It works by calculating the length of each sentence and the number of syllables each contains. These results are then fed into a formula which calculates readability on a scale from 0 to 100. Easy to read texts have high scores, while hard texts score badly.

You can see what these scores mean in practice by referring to Table 1. The readability score is based on work by R. Flesch, and it is broadly comparable with the better known FOG index. The FOG index is an American scale for measuring reading levels. The formula used to obtain a FOG rating is: (Average sentence length + percentage of hard words found) \times 0.4.

Easy Reader particularly dislikes long sentences and long words. If your text contains lots of these then the program will judge it as being very hard to read.

Any View files can be processed, on disc or tape, and the program should be able to handle texts of any length. If your file is very long and you only want to assess part of it, you can use the View WRITE command to create a smaller file first.

Feed your View files through PAUL MEARA's text analyser to find out just how readable they really are

Score	Where normally found	Suitability
0-30	Very hard scientific texts	Very serious readers only
30-50	Difficult academic writing	Students or similar readers
50-60	Quality newspapers	Intelligent teenagers
60-70	Reader's Digest type articles	About 75 per cent of the population
70-80	Fairly easy fiction	About 80 per cent of the population
80-90	Popular daily newspapers	An average 11 year old
90-100	Comics and childrens' books	Beginning readers

Table 1: How to interpret the readability scores

Style report for TEXT

Sentence No. 1
this is ... reader

v. hard v. easy 99

Diagnostics:

This sentence is 7 words long. Its clause structure is simple and it contains the following hard words and jargon?
none

Sentence No. 2
while ... readable text

v. hard v. easy

54

Diagnosics:

This sentence is 17 words long. Its clause structure is complex and it contains the following hard words and jargon:
..detailed..guidelines..producing..readable

Figure 1: Easy Reader in action

If your text contains lots of tables or figures, it's a good idea to edit these out before running it through Easy Reader. And although the program was designed to work with View, it should cope with most other word processor files too.

Type in Program I and save it as **READER**. Before you run it, make sure that **PAGE** is set no higher than

&1D00, or Easy Reader will crash when it finds a longish sentence.

Most Electrons will never have PAGE set higher than &1D00, but some specialist roms can conceivably grab more memory for themselves.

When run, the program will ask you for the name of the file you want to assess. Type it in and hit Return.

Next, you will be prompted to enter a threshold level of difficulty.

This is the point below which Easy Reader will provide detailed diagnostics for a given sentence. For instance, should you enter 60 at this point, then any sentence with a FOG rating lower than this will be described in some detail as to why it is rated hard to

Style report for TEXT

This table shows you how EASY READER rated your text overall. Each sentence is rated on a scale from 0 (hard to read) to 100 (easy to read). The table shows how many sentences fell into each readability band.

Score:	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90+
No. of Sents:	0	0	0	0	0	1	0	0	0	1

see documentation for how to interpret these scores

Figure 11: The report summary

read.

So type in a number between 1 and 100, and hit Return. The program will then ask you if you want a hard copy — or printout — to which press Y or N accordingly. Processing will commence immediately, and Easy Reader should run along on its own until it reaches the end of your file.

Each sentence's number will be printed on the screen, followed by the first and last word of the sentence — helping you to

compare the printed report later on with the original text.

On the right is a small readability scale, and a sentence's score will be marked on it both graphically, and as a number. This scale is re-drawn for each each new sentence, so if printed out on paper you will have a complete record.

Figure 1 shows you the screen display while Easy Reader is in action, and it has found the second sentence to be more complex in

structure than the first.

When it has finished processing your file, it will display a summary of the analysed text. Ten headings are printed, each one representing a 10-number wide score zone.

The number of sentences which fell into a particular zone are printed beneath the relevant heading, as shown in Figure 11.

Any sentences which score less than the threshold level will have a further, more detailed breakdown

displayed. This tells you how simple or complex the clause structure was, and lists all of the hard words that were found.

If the program says that one of your sentences is hard to read, you will generally be able to make it more readable by avoiding "hard" words.

Any words which Easy Reader considers to be in this category are listed in the sentence analysis.

Splitting a long sentence into two shorter ones also helps the readability rating a great deal. But remember, it isn't always good style to keep using simple sentences.

Use Table 1 to help you decide what level of reader you are aiming at, and try to get your sentences scoring in this general area.

One or two hard sentences in a page of text won't really matter, but if your text is consistently marked as very unreadable, or too easy, maybe you need to re-work it totally.

Easy Reader isn't a very clever analyser, and you shouldn't take it too seriously. After all, it thought that this article was wonderful.

```

10 REM EASY READER
20 REM By Paul Meara
30 REM (c) Electron User
40 REM
50 ON ERROR GOTO 150
60 MODE 3
70 PROCsetup
80 REPEAT
90 PROCgetsent
100 IF OK=TRUE PROCread(ST
ART%,FINISH%)
110 UNTIL EOF#AX
120 PROCclose
130 PROCshowtotals
140 END
150 PROCerror
160 STOP
170 DEFPROCpause
180 PRINT "LS" "Hit space
bar to go on"LS
190 *FX15,0
200 REPEAT:Z=GET:UNTIL Z=3
210 CLS
220 ENDPROC
230 DEFPROCsetup
240 DIM D(20)
250 LS=STRING$(79," ")
260 STARTX=62F00
270 INPUT "file to be an
alysed? " FL$
280 AX=OPENIN(FL$)
290 PRINT "Threshold for
diagnostic report?"(type
in a number between 1 and 10
0)"
300 REPEAT: INPUT THOLDX:
UNTIL THOLDX>0 AND THOLDX<10
1
310 PRINT "Do you want a
hard copy? Y/N"
320 Z=GET
330 IF Z=89: C1=45: C2=94
: HCOPI=TRUE
340 IF Z<>89 VDU3: C1=224:
C2=225: HCOPI=FALSE
350 HWORDX=17-INT(SQR(THOL
DX))
360 VOWELS="aeiouy"
370 SMARKS=".,!/:WMARKS="
+SMARKS: PUNCS="/( )-+CHR
$(34)
380 CMARKS="/but/so/when/w
ho/which/that/if/despite/bec
ause/although/while/"
390 SENTNOX=0
400 VDU23 224,255,129,129,
129,129,129,129,255
410 VDU23 225,255,255,255,
255,255,255,255
420 CLS
430 IF HCOPI=TRUE VDU2
440 PRINT "LS
450 PRINT "Style report f
or "FL$
460 ENDPROC
470 DEFPROCgetsent
480 OK=TRUE
490 SENTNOX=SENTNOX+1
500 NX=STARTX:FINISHX=0
510 REPEAT
520 NX=NX+1: CX=BGET#AX:CS=
CHRS(CX)
530 IF CX>127: REPEAT: CX=B
GET#AX:UNTIL CX=13: REPEAT: C
X=BGET#AX:UNTIL CX=13
540 IF INSTR(PUNCS,CX)>0 O
R CX<32 OR CX>127 CX=32
550 IF INSTR(SMARKS,CX)>0
FINISHX=NX
560 ?NX=(CX OR 32)
570 IF EOF#AX OR NX>(HINEM
-20) PROCnotok
580 UNTIL FINISHX<>0
590 ENDPROC
600 DEFPROCnotok
610 OK=FALSE: FINISHX=NX
620 IF EOF#AX ELSE PRINT
"This sentence is too long
to handle"
630 ENDPROC
640 DEFPROCread(iX,jX)
650 PROClabel
660 WX=0:SLX=0:CLX=0:HWS="
":LWS="":WS="
670 IF (jX-iX)<12 PRINTTAB
(40)1 can't make sense of t
his sentence:ENDPROC
680 REPEAT: PROCnextword:
UNTIL iX=jX
690 PROCfeedback
700 ENDPROC
710 DEFPROClabel :REM prin
ts first and last words of c
urrent sentence
720 PRINT"LS
730 PRINT "Sentence No. "
:SENTNOX:TAB(40)"v. hard";SP
C(20);"v. easy"
740 NX=0:WS="":REPEAT:NX=N
X+1:WS=WS+CHRS(?((iX+N
X)):UNTIL(LEN(WS)>5 AND ?(iX+N
X)=32) OR ((iX+N
X)=jX):PRINT WS
...;
750 NX=0:WS="":REPEAT:NX=N
X+1:WS=CHRS(?((jX-N
X))+WS:UNTIL(LEN(WS)>5 AND ?(jX-N
X)=32) OR ((jX-N
X)=iX+1):PRINT WS
;
760 ENDPROC
770 DEFPROCnextword
780 LASTWORDS=WS:WS="

```

Turn to Page 50 ►

Feature

◀ From Page 49

```

790 REPEAT:IX=IX+1:UNTIL ?
IX>32:REM strips blanks
800 REPEAT: WS=WS+CHRS(?IX
): IX=IX+1:UNTIL(INSTR(WMARK
$,CHRS(?IX))>0) OR (IX>JX)
810 WX=WX+1
820 IF LEN(WS)<4 SLX=SLX+1
:WS="":ENDPROC
830 FOR WX=1 TO LEN(WS)-1
:
840 IF INSTR(VOWELS,MIDS(W
$,WX,1))>0 AND INSTR(VOWELS,
MIDS(WS,WX+1,1))=0 THEN SLX=
SLX+1 :REM counts syllables
850 NEXT
860 IF INSTR(MARKS,"/")+WS
+ "/">0 CLX=CLX+1 :REM check
s clauses
870 IF LEN(HWS)>200 ENDPROC
880 IF LEN(LASTWORDS)<HWOR
D% AND (LEN(LASTWORDS)+LEN(
WS)>HWORDX+2) HWS=HWS+"."+L
ASTWORDS+" "+WS ELSE IF LEN(
WS)>HWORDX HWS=HWS+"."+WS
890 ENDPROC
900 DEFPROCfeedback
910 IF WX<4 PRINTTAB(50)

```

```

too short to analyse":ENDPRO
C
920 P=INT (206.84-(85*SLX/
WX)-(1.02*WX))
930 IF P>99 P=99
940 IF P<1 P=1
950 PX=2+INT((P*1.75)/100)
960 DX=P DIV 10:D(DX)=D(DX
)+1
970 PRINTTAB(40) STRINGS(P
X-1,CHRS(C1));CHRS(C2);STRIN
GS(34-PX,CHRS(C1));" ";P
980 IF P>=THOLD% ENDPROC
990 PRINT "Diagnostics:"
1000 PRINT " This sentenc
e is ";WX" words long. Its c
lause structure is ";
1010 IF CLX>1 PRINT "very "
;
1020 IF CLX>0 PRINT "comple
x" ELSE PRINT "simple"
1030 PRINT " and it conta
ins the following hard words
and jargon:"
1040 IF LEN(HWS)=0 HWS="non
e"
1050 PROClongprint(HWS)
1060 ENDPROC

```

```

1070 DEFPROClongprint(z$)
1080 REPEAT
1090 IF LEN(z$)>70: z=70:RE
PEAT:z=z-1:UNTIL MIDS(z$,z,1
)=":PRINT " ";LEFT$(z$,z)
:z$=MIDS(z$,z+1)
1100 UNTIL LEN(z$)<=70
1110 PRINT " ";z$
1120 ENDPROC
1130 DEFPROCclose
1140 PRINT "
1150 IF EOF#AX PRINT "end o
f text"
1160 CLOSE#0
1170 VDU3
1180 PROCpause
1190 ENDPROC
1200 DEFPROCshowtotals
1210 IF HCOPI=TRUE VDU2
1220 CLS
1230 PRINT LS
1240 @X=800007
1250 PRINT "Style report f
or 'FLS
1260 PRINT LS
1270 PRINT "This table sho
ws you how EASY READER rated
your text overall."Each s

```

```

entence is rated on a scale
from 0 (hard to read) to 100
(easy to read)."The table
shows how many sentences fe
ll into each readability ban
d."
1280 PRINT LS
1290 PRINT "Score: 0-9
10-19 20-29 30-39 40-49
50-59 60-69 70-79 80-89
90+"
1300 PRINT LS:PRINT "No. of
Sents:";
1310 FOR I=0 TO 9:PRINT D(I
);NEXT
1320 PRINT LS
1330 PRINT "see documentat
ion for how to interpret the
se scores"
1340 VDU3
1350 PROCpause
1360 ENDPROC
1370 DEFPROCerror
1380 REPORT: PRINT " at lin
e "; ERL
1390 CLOSE#0
1400 VDU3
1410 ENDPROC

```

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Knock Out Whist listing

◀ From Page 27

```

10 REM Knock out whist
20 REM by Robert Charlton
30 REM (c) Electron User
40 ON ERROR IFERR=17 RUN EL
SEMODE6:PRINT:REPEAT:PRINT
at line:ERL
50 MODE6:PROCchrs
60 IFPAGE>8000 PROCrelloc
70 MODE1:VDU23,1,0;0;0;0;
:DIMHS(7,1),DS(26):REPEAT:PR
OCinit:PROCplay:PX=FALSE
80 REPEAT:PROCshuf:CX=CX-
1:RX=RX+1:PROCplay:UNTILQX:U
NTILNOT FNnot:END
90 DEFPROCplay:PROCdeal(C
X):PROCdisp:IFNOTPX PROCcall
(WX):WX=FALSE
100 OFX=FX:FORGX=1TOCX:IFF
X=1 PROCchuma:PROCcomp ELSE P
ROCComp:PROCchuma
110 PROCcudn:PROCclear:NEX
T:IFEX>0X WX=2 ELSE IF EX<0X
WX=1 ELSE PROCcut
120 IFNOTPX AND EX=0 QX=2
ELSE IFNOTPX AND DX=0 QX=1
130 IFOFX=1 FX=2 ELSE FX=1
140 ENDPROC
150 DEFPROCchrs:VDU23,239
,76,82,82,82,82,82,76,0,23,2
40,54,127,127,127,62,28,0,8,0
,23,241,8,28,28,107,127,107,8
,28,23,242,8,28,62,127,62,28
,8,0,23,243,8,28,62,127,127
,127,28,62
160 VDU23,224,42,63,16,20,
17,17,16,19,23,225,168,248,1
6,80,16,16,16,144,23,226,9,8
,8,8,10,8,31,21,23,227,200,8
,136,136,40,8,252,84
170 VDU23,228,15,63,48,116
,113,209,208,19,23,229,224,2
48,24,92,28,22,22,144,23,230
,9,104,104,56,58,24,31,7,23,
231,200,11,139,142,46,12,252
,240
180 VDU23,232,15,63,48,52,
49,17,16,19,23,233,224,248,2
4,88,24,16,16,144,23,234,9,8
,8,24,26,24,31,7,23,235,200,
8,136,140,44,12,252,240
190 VDU23,242,50,0,0,6,102,
105,105,102,23,246,8,7,8,126
,126,153,153,126,23,247,32,1
92,32,120,126,150,150,102
200 VDU23,248,102,105,105,
126,30,4,3,4,23,249,126,153,
153,126,126,16,224,16,23,250
,102,150,150,102,96,0,0,0:EN
VELOPE1,1,4,-4,4,2,2,2,126,0
,0,-126,126,126:ENDPROC
210 DEFPROCinit:MS=CHR$10+
CHR$8+CHR$8+CHR$8:BS=CHR$245
+CHR$246+CHR$247+MS+CHR$248+
CHR$249+CHR$250
220 KS=CHR$224+CHR$225+MS+
BS+MS+CHR$226+CHR$227:QS=CHR
$228+CHR$229+MS+BS+MS+CHR$23
0+CHR$231
230 JS=CHR$232+CHR$233+MS+
BS+MS+CHR$234+CHR$235:WX=0:R
X=0:CX=7:PX=TRUE:TX=0:RX=0:
Z=0:QX=FALSE:EX=0:DX=0:
PROCshuf:ENDPROC
240 DEFPROCshuf:CLS:COLOUR
2:PRINTTAB(16,10);"* Shuffli

```

```

ng *":PS="DQCKHJC355C8D9H3S9
DAKH7S4DTH5SKS6D2HTC2S8D6C9
HQH2CAS3D55JC4D7H4D8CQH9C5
CJD3DKS7HAS2D7C6CTSQH8D4STA
H6"

```

```

250 FORLX=1 TO 26:CX=RND(5
3-LX):DS(LX)=MID$(PS,(2+CX)-
1,2):PS=LEFT$(PS,2+(CX-1))+M
ID$(PS,(2+CX)+1):NEXT:PRINTT
AB(14,10):SPC13:ENDPROC

```

```

260 DEFPROCdeal(numX):PX=1
:FORLX=1TOnumX:HS(LX,0)=DS(p
X):PX=pX+1:HS(LX,1)=DS(pX):p
X=pX+1:NEXT:EX=0:DX=0:ENDPR
OC

```

```

270 DEFNFSuit(cS):sS=LEFTS
(cS,1):IFsS="H" =1 ELSEIFsS=
"C" =2 ELSEIFsS="D" =3 ELSEI
FsS="S" =4 ELSE =0

```

```

280 DEFNFIett(val):IFval>=
2 AND val<=9 =CHR$(val+48) E
LSEIFval=10 =CHR$239 ELSEIFv
al=11 =J" ELSEIFval=12 =Q"
ELSEIFval=13 =K" ELSEIFval
=14 =A" ELSE =

```

```

290 DEFNFIname(n):IFn=1 ="h
earts" ELSEIFn=2 ="clubs"
ELSEIFn=3 ="diamonds" EL
SEIFn=4 ="spades" ELSE =

```

```

300 DEFNFIcol(suit):IFsuit=
1 OR suit=3 =1 ELSEIFsuit=2
OR suit=4 =0 ELSE =-1

```

```

310 DEFNFIHnum(cS):nS=RIGHTS
(cS,1):IFnS="T" =10 ELSEIFnS
="J" =11 ELSEIFnS="Q" =12 E
LSEIFnS="K" =13 ELSEIFnS="A"
=14 ELSE =VAL(nS)

```

```

320 DEFPROCdisp:COLOUR1:PR
INTTAB(0,1);"Round:";COLOUR2
:PRINTTAB(6,1);RX:COLOUR1:PR
INTTAB(10,1);"Cards:"

```

```

330 COLOUR2:PRINTTAB(16,1)
;CX:COLOUR1:PRINTTAB(20,1);"
Lead:";COLOUR2

```

```

340 IFFX=1 PRINTTAB(25,1);
"you" ELSE PRINTTAB(25,1);"m
e"

```

```

350 COLOUR1:PRINTTAB(30,1)
;"Call:";COLOUR2

```

```

360 IF PX PRINTTAB(35,1);"
---" ELSE IFWX=1 PRINTTAB(35
,1);"you" ELSE PRINTTAB(35,1
);"me"

```

```

370 COLOUR1:PRINTTAB(0,15)
;"Trumps:";COLOUR2:PRINTFN
ame(TX):COLOUR1:PRINTTAB(25
,15);"Tricks: you"

```

```

380 COLOUR2:PRINT;DX:COLO
UR1:PRINTTAB(34,16);"me ";CO
LOUR2:PRINT;EX:COLOUR1:PRIN
TAB(0,19);"You lay:";TAB(25
,19);"I lay:"

```

```

390 PROCshow:ENDPROC
400 DEFPROCdraw(X,YX,card
S):VX=FNnum(cards):suX=FNsui
t(cardS):coX=FNcol(suX):num$
=FNlett(VX)

```

```

410 S$=CHR$(239+suX):VDU29
,X,YX-256;S,24,8;8;120;248;
:GCOL0,131:CLG:GCOL0,coX

```

```

420 IF VX<=10 OR VX=14 PRO
Ccard(VX) ELSEIFVX=11 PROCja
ck ELSEIFVX=12 PROCQueue ELSE
IFVX=13 PROCking

```

```

430 GCOL0,0:PLOT69,8,248:P
LOT69,8,8:PLOT69,120,248:PLO
T69,120,8:GCOL0,128:GCOL0,3:

```



```

VDU29,0;0;26,4:ENDPROC
440 DEFPROCcard(vX):IFvX=1
4 vX=1

```

```

450 RESTORE480:FORLX=vXT01
0:READsS:NEXT:MOVE16,240:PR
INTnumS:MOVE80,48:PRINTnumS:A
S="":FORLX=1 TO vX:AS=AS+MID
$(sS,(LX+2)-1,1)+0*MID$(sS
,(LX+2),1)+0"

```

```

460 AX=EVAL("8"+LEFT$(AS,2
)):BX=EVAL("8"+RIGHT$(AS,2))
:MOVEAX,BX:PRINTS$;AS="

```

```

470 NEXT:ENDPROC
480 DATATC5C3B1A18165A5856
37,1C5C391A18165A5856,1C1916
5C59563A37,1C19165C59563A,1C
19165C5956,1C165C5639,1C165C
56,3C5936,3C36,39

```

```

490 DEFPROCjack:MOVE16,240
:PRINTJ":MOVE80,48:PRINTJ"
:MOVE16,192:PRINTS$;JS:S$:EN
DPROC

```

```

500 DEFPROCQueue:MOVE16,240
:PRINTQ":MOVE80,48:PRINTQ"
:MOVE16,192:PRINTS$;QS:S$:EN
DPROC

```

```

510 DEFPROCking:MOVE16,240
:PRINTK":MOVE80,48:PRINTK"
:MOVE16,192:PRINTS$;KS:S$:EN
DPROC

```

```

520 DEFPROCshow:FORYX=1 TO
CX:PROCdraw(48+(160*(YX-1))
,896,HS(YX,0)):PRINTTAB((YX*
5)-2,12);YX:SOUND1,-15,YX*5,
2:NEXT:ENDPROC

```

```

530 DEFNFIkey(miX,maX):*FX2
1,0

```

```

540 REPEAT:AS=GETS:UNTILAS
>=STR$(miX) AND AS<=STR$(maX
):=VALAS

```

```

550 DEFPROCwipe(n):VDU26,4
8+(160*(n-1)):640;176+(160*(
n-1)):896;CLG:VDU26:ENDPROC

```

```

560 DEFPROCplay(nX,pX):IFpX
=0 PROCdraw(64,320,HS(nX,pX)
)

```

```

570 IFpX=1 PROCdraw(832,32
0,HS(nX,pX))
580 ENDPROC

```

```

590 DEFPROCchuma:COLOUR1:CO
LOUR130:PRINTTAB(0,19);"You
lay:";COLOUR2:COLOUR128:REPE
T:PRINTTAB(8,19);hnX=FNkey(
1,CX):PRINT;hnX:leX=TRUE:hsX
=FNsui(H$(hnX,0)):IFFX=2 PR
OCchumck

```

```

600 IFhsX=0 leX=FALSE
610 IFNOTleX PRINTTAB(8,19
);"Illegal":SOUND1,-15,0,2:P
ROCdel(2):PRINTTAB(0,19);SPC
7

```

```

620 UNTILleX:COLOUR1:COLO
UR128:PRINTTAB(0,19);"You lay

```

```

":COLOUR2:PROCwipe(hnX):PROC
lay(hnX,0):PRINTTAB(8,19);"
":ENDPROC

```

```

630 DEFPROCchumck:PROCgval
s(cX):IFhsX<>cX AND FNchec
k(cX,0)=TRUE leX=FALSE
640 ENDPROC

```

```

650 DEFNFIcheck(suX,handX):
FORLX=1TOCX:IFFNFSuit(H$(LX,h
andX))=suX LX=CX:NEXT:=TRUE
660 NEXT:=FALSE

```

```

670 DEFPROCComp:IFGX=CX PR
OClast ELSE IFFX=2 PROCmyld
ELSE PROCyould

```

```

680 COLOUR2:PRINTTAB(31,19
);cnX:PROCplay(cnX,1):PRINTT
AB(31,19);":ENDPROC

```

```

690 DEFPROClast:FORLX=1TOC
X:IFHS(LX,1)<=" cnX=LX
700 NEXT:ENDPROC

```

```

710 DEFPROCmyld:hX=FNfind(
S,FX,0,FALSE,TRUE):cX=FNfin
d(S,0,0,FALSE,TRUE)

```

```

720 IF(FNnum(H$(hX,1))<7 A
ND FNnum(H$(cX,1))>FNnum(H$(
hX,1))) ORhX=0 cnX=cX ELSE
cnX=hX

```

```

730 ENDPROC
740 DEFPROCyould:hsX=FNsui
t(H$(hnX,0)):hvX=FNnum(H$(hn
X,0)):IFFNcheck(hsX,1)=FALSE
PROCothr:ENDPROC

```

```

750 IFFNhigh(hsX,hvX)=FALS
E cnX=FNfind(hsX,0,0,TRUE,FA
LSE) ELSE cnX=FNfind(hsX,0,h
vX,TRUE,FALSE)

```

```

760 ENDPROC
770 DEFNFIhigh(sX,vX):FORLX
=1TOCX:PROCgvals(LX):IFcsX=s
X AND cvX>vX LX=CX:NEXT:=TRU
E

```

```

780 NEXT:=FALSE
790 DEFPROCothr:IFFNcheck(
TX,1)=TRUE cnX=FNfind(TX,0,0
,TRUE,FALSE):ENDPROC

```

```

800 cnX=FNfind(S,0,0,TRUE,
FALSE):ENDPROC

```

```

810 DEFPROCcaden:PROCgvals(
cnX):hsX=FNsui(H$(hnX,0)):h
vX=FNnum(H$(hnX,0)):IFcsX=hs
X AND cvX>hvX PROCcwin:END
PROC ELSE IFcsX=hsX AND hvX>
cvX PROCcwin:ENDPROC

```

```

820 IFcsX=TX PROCcwin:EN
DPROC ELSE IF hsX=TX PROCcwin
:ENDPROC

```

```

830 IFFX=2 PROCcwin ELSE
PROCcwin

```

```

840 ENDPROC
850 DEFPROCcwin:PROCf:DX

```

Turn to Page 52 ▶

Knock Out Whist listing

4 From Page 51

```

=Dx+1:COLOUR1:PRINTTAB(25,15);
);Tricks: you ":COLOUR2:PRINT;
Dx:COLOUR1:PRINTTAB(34,16);
);me ";
860 COLOUR2:PRINT;EX:PRINTTAB(14,20);
);You won!":PROCDEL(3):PRINTTAB(17,20);
);SPC8:FX=1:ENDPROC
870 DEFPROCcompwin:PROCLOSE:EX=EX+1:COLOUR1:PRINTTAB(25,15);
);Tricks: you ":COLOUR2:PRINT;
Dx:COLOUR1:PRINTTAB(34,16);
);me ":COLOUR2:PRINT;
EX:PRINTTAB(14,20);
);I won!":PROCDEL(3):PRINTTAB(17,20);
);SPC7:FX=2:ENDPROC
880 DEFPROCclear:VDU28,0,31,39,20,12,26:HS(hn,0)=":H
S(cn,1)":"ENDPROC
900 DEFPROCcall(pX):IFpX=1:PROCgsuit:ENDPROC ELSE PROC
choose:ENDPROC
910 DEFPROCgsuit:COLOUR1:COLOUR130:PRINTTAB(0,17);
);cho
ose trumps H/C/D/S":COLOUR2:COLOUR128:PRINTTAB(21,17);
);FX21,0
920 REPEAT:AS=GET$:UNTILIN
STR("HCD",AS):PRINTAS:AS=AS
+ ":TX=FNsuit(AS):COLOUR1:P

```

```

RINTTAB(0,15);Trumps":COLOUR2:PRINTFNname(TX)
930 PRINTTAB(0,17);SPC24:ENDPROC
940 DEFPROCchoose:hX=0:cX=0:dX=0:sX=0:FORLX=1 TO CX:PROCgvals(LX)
950 IFcsX=1 hX=hX+1 ELSEIFcsX=2 cX=cX+1 ELSEIFcsX=3 dX=dX+1 ELSEIFcsX=4 sX=sX+1
960 NEXT:TX=FNbig(hX,cX,dX,sX):COLOUR2:PRINTTAB(0,17);
);I choose ":FNname(TX):COLOUR1
970 PRINTTAB(0,15);Trumps":COLOUR2:PRINTFNname(TX):PROCDEL(3):PRINTTAB(0,17);SPC18:ENDPROC
980 DEFFNbig(aX,bX,cX,dX):IF aX>=bX AND aX>=cX AND aX>=dX =1
990 IF bX>=aX AND bX>=cX AND bX>=dX =2
1000 IF cX>=aX AND cX>=bX AND cX>=dX =3
1010 IF dX>=aX AND dX>=bX AND dX>=cX =4
1020 DEFPROCgvals(aX):csX=FNsuit(HS(aX,1)):cvX=FNnum(HS(aX,1)):ENDPROC
1030 DEFFNnot:CLS:COLOUR1:IFQX=1 PRINTTAB(3,10);The computer beat you in round";
RX ELSEIFQX=2 PRINTTAB(3,10);You beat me in round";RX;
";well done!"

```

```

1040 COLOUR2:PRINTTAB(10,20);Play again (Y/N)?:REPEAT:GET$:UNTILINSTR("YyNn",AS):IFINSTR("Nn",AS) CLS:PRINT"Bye!":END
1050 =TRUE
1060 DEFPROCcut:REPEAT:PRINTTAB(13,23);A draw!";TAB(10,25);Cut for winner":COLOUR1:PRINTTAB(0,19);You pick:";TAB(25,19);I pick:"
1070 COLOUR2:c1S=DS(RND(13)):c2S=DS(RND(13)+13):PROCdraw(64,320,c1S):PROCdel(2.5)
1080 PROCdraw(832,320,c2S):cvX=FNnum(c1S):chvX=FNnum(c2S):PRINTTAB(13,23);SPC7:COLOUR1
1090 PRINTTAB(0,19);You lay:";TAB(25,19);I lay:";COLOUR2:PRINTTAB(10,25);SPC14;TAB(13,23);UNTILhvX<cvX
1100 IFhvX>cvX PROCf:PRINTYou won!":Dx=Dx+1:FX=1 ELSE PROCclose:PRINTI won!":EX=EX+1:FX=2
1110 *FX21,0
1120 WX=FX:PROCDEL(3):PRINTTAB(13,23);SPC8:ENDPROC
1130 DEFFNfind(suX,nsX,minX,LoX,hiX):maxX=15:FORLX=1 TO CX:PROCgvals(LX):IFcsX=suX AND csX<nsX PROCtest
1140 IFsuX=5 AND csX<nsX PROCtest

```

```

1150 NEXT:=cnX
1160 DEFPROCtest:IF LoX=TRUE AND cvX<maxX AND cvX>minX maxX=cvX:cnX=LX
1170 IF LoX=TRUE AND cvX<maxX AND cvX>minX maxX=cvX:cnX=LX
1180 IFhiX=TRUE AND cvX>minX minX=cvX:cnX=LX
1190 ENDPROC
1200 DEFPROCdel(QX):TIME=0:REPEATUNTILTIME>(QX*100):ENDPROC
1210 DEFPROCf:RESTORE1220:REPEAT:READpX,dX:SOUND1,-15,pX,dX:SOUND1,0,0,1:UNTILpX=120:ENDPROC
1220 DATA100,1,108,2,100,1,120,6
1230 DEFPROCclose:SOUND1,1,30,4:SOUND1,0,0,2:SOUND1,1,10,6:ENDPROC
1240 DEFPROCreloc:*K,1 *T,1 MF,LX=0 TO TOP-PA. S.4:LX1800=LX:PA.:N.1MPA.=800:MO.ING.70IM
1250 *FX130,0,129
1260 END

```

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Tennis is a two player game based on the popular video tennis games of the late 1970s.

Each player controls a bat, facing the other across the court, and the object is simply to keep the ball in play until your opponent lets it go past.

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ANYONE FOR TENNIS?

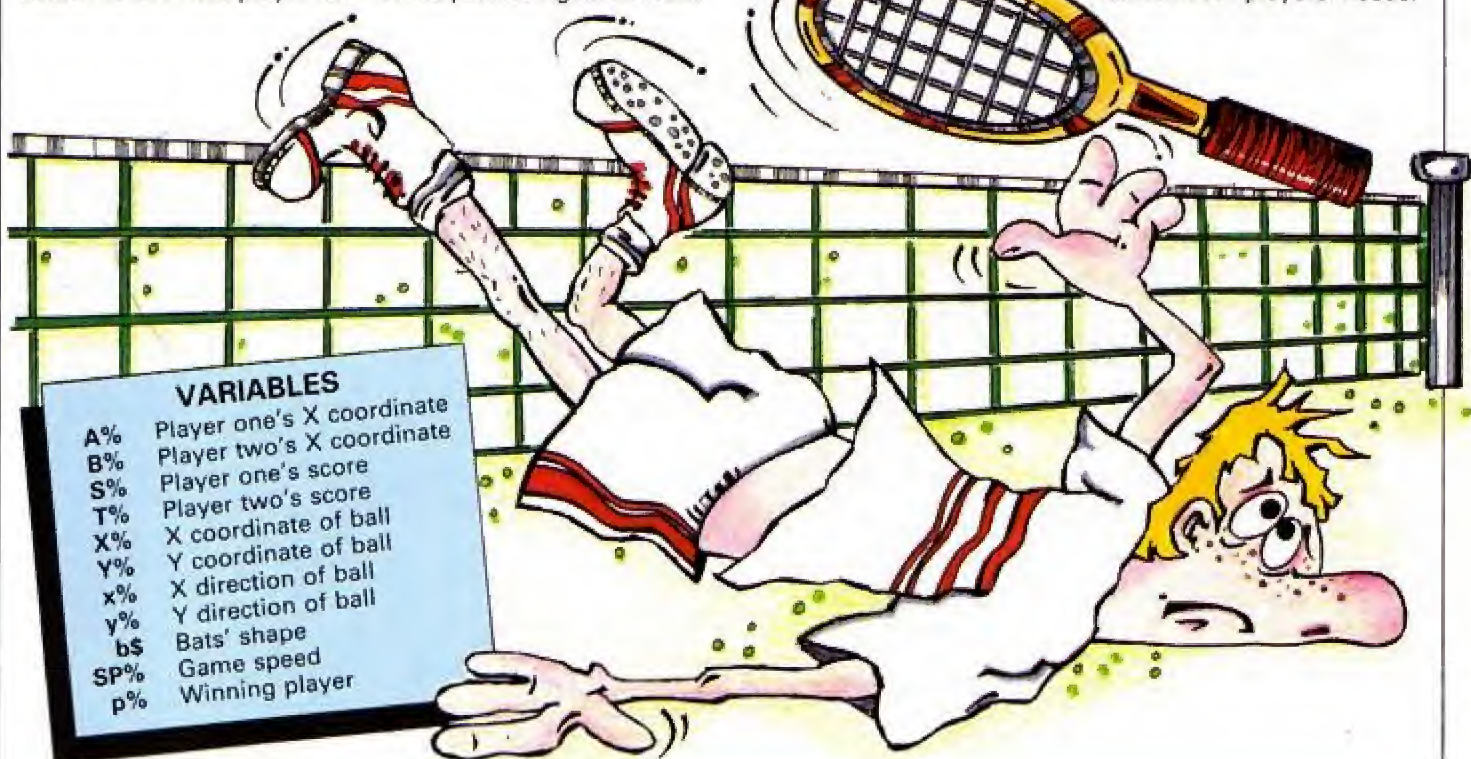
That's the question of the day with FRASER BAIN's fast two player game

win 10 games – hence the name Tennis.

The ball is always served from the centre of court, travelling toward the loser of the previous game unless

a new match has begun, in which case the ball is always served toward the left-hand

player. Before each match starts you have the option of a fast or a slow game. The speed difference is not great, but should be enough to suit both players' needs.



```
10 REM Tennis
20 REM By Fraser Bain
30 REM (c) Electron User
40 *FX16
50 MODE4:VDU23,1,0;0;0;0;
23,225,24,126,126,255,255,12
6,126,24,23,224:FORIX=1TO8:V
DU255:NEXT
60 SX=0:TX=0:bx="" *STRIN
GS(4,CHR$224)*" ":REPEATYX=R
ND(3)-2:UNTILYX<>0
70 PRINTTAB(13,6)*T E N -
N I STAB(12,12)*By Fraser
BainTAB(11,15)*(c) Electron
UserTAB(9,19)*(F)ast OR (S
)low game?:REPEATGX=GETAND&
DF:UNTILGX=70ORGX=83:SPX=0:1
```

```
FGX=83SPX=25
80 REPEATMODE4:VDU23,1,0;
0;0;0;
90 MOVE319,0:DRAW319,1024
100 MOVE1153,0:DRAW1153,10
24
110 PRINTTAB(1,2)*PLAYER 1
TAB(1,29)*PLAYER 2TAB(2,15
)*SCORETAB(4,10);SX;TAB(4,2
0);TX
120 AX=20:BX=20:XX=RD(22)
+11:YX=15
130 REPEATX=RD(3)-2:UNTI
LX<>0
140 PRINTTAB(AX,2)b$TAB(BX
,29)b$TAB(XX,YX)CHR$225
150 FORIX=1TO2000:NEXT:SOU
```

```
ND1,-15,110,2
160 REPEATFORIX=1TOSPX:NEX
T
170 HX=(INKEY-98-INKEY-67)
:IFHX ANDAX+HX>9THENIFAX+HX<
31AX=AX+HX:PRINTTAB(AX,2)b$
180 HX=(INKEY-104-INKEY-10
5):IFHX ANDBX+HX>9THENIFBX+H
X<31BX=BX+HX:PRINTTAB(BX,29)
b$
190 VDU31,XX,YX,32:XX=XX+x
X:YX=YX+yX:IFXX=340RXX=11X=
-X:VDU31,XX,YX,225:SOUND1,-
15,200,1ELSEVDU31,X1,YX,225
200 IF(YX=3ANDX1>=AX ANDX1
<=AX+4)OR(YX=28ANDX1>=BX AND
X1<=BX+4)YX=-YX:SOUND1,-15,1
```

```
30,2
210 UNTILYX<20RYX>29:SOUND
1,-15,160,2:SOUND1,-15,140,1
:YX=1:IFYX<3TX=TX+1:YX=-1ELS
ESX=SX+1
220 UNTILSX=100RTX=10:PRIN
TTAB(4,10);SX TAB(4,20);TX:p
X=ST=10
230 PRINTTAB(16,15)*FINAL
SCORETAB(12,17)*Player ";pX
+2;" beat Player ";1-pX;
240 PRINTTAB(11,19)*with t
he score of 10 - ";:IFpX PRI
NT;TX ELSEPRINT;SX
250 PRINTTAB(16,25)*PRESS
SPACE*:REPEATUNTILINKEY=99:R
UN
```


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